

CCD-FX228/FX230/FX330

RMT-708

SERVICE MANUAL

US Model
CCD-FX228/FX230/FX330
Canadian Model
CCD-FX230/FX330

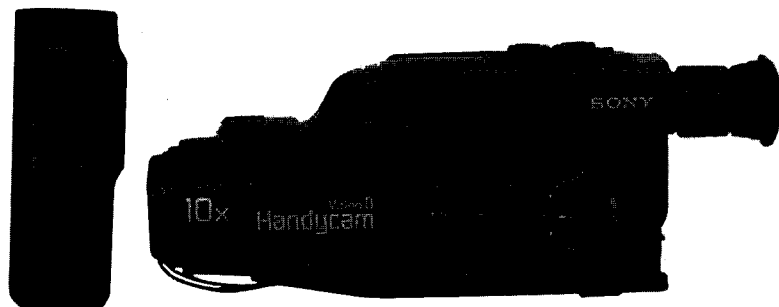


Photo : CCD-FX230

Remote Commander (CCD-FX330 only)
Remote commander is available as a unit. But as individual parts the battery case lid of commander is only available.

**Video8
Handycam**

A MECHANISM

For MECHANISM ADJUSTMENTS, refer to the
"8 mm Video MECHANICAL ADJUSTMENT
MANUAL IV" (9-973-199-11).

SPECIFICATIONS

System

Video recording system

Two rotary heads, Helical scanning FM system

Audio recording system

Rotary head, FM system

Video signal

NTSC color, EIA standards

Usable cassette

8 mm video format cassette (standard 8 mm)

Tape speed

SP mode: Approx. 19/32 inches/s (1.43 cm/s)
LP mode: Approx. 5/16 inches/s (0.72 cm/s) (playback only)

Recording time

SP mode: 2 h (P6-120)

Playback time

SP mode: 2 h (P6-120)
LP mode: 4 h (P6-120)

Fast forward/rewind time

Approx. 6 min 30 s (P6-120)

Image device

CCD (Charge Coupled Device)

Viewfinder

Electronic viewfinder
CCD-FX228/FX230:
monochrome
CCD-FX330: color

Lens

Combined 10 × power zoom lens
f = 1/4 - 2 1/2 inches (6.1 - 61 mm)
1 3/4 - 17 3/8 inches (44 - 440 mm) when converted into a 35-mm still camera
F1.6 to 2.4 with macro
Filter diameter: 37 mm (1 1/2 inches)
TTL autofocus system inner focus wide macro system

Color temperature

Auto

Minimum illumination

2 lx

Illumination range

2 lx to 100,000 lx

Recommended illumination

More than 100 lx

Aperture correction

Automatic with backlight adjustment

Output connectors

Video output

Phono jack, 1 Vp-p, 75Ω, unbalanced sync negative

Audio output

Phono jack, -7.5 dBs, (at load impedance 47 kΩ)
Impedance less than 2.2 kΩ

RFU OUT

Special mini-jack, DC 5 V

LANC control jack

Stereo mini-minijack (ø 2.5 mm)

MIC jack

Minijack, -66dBs, low impedance with 2.5 to 3.0 V
DC output, impedance 6.8 kΩ (ø 3.5 mm)

General

Power requirements

On battery mounting surface
6.0 V (battery pack)
7.5 V (AC power adaptor)

Average power consumption

When camera recording
CCD-FX228/FX230: 5.0 W
CCD-FX330: 5.5 W

Installation

Vertically, Horizontally

Operating temperature

32°F to 104°F (0°C to 40°C)

Storage temperature

-4°F to 140°F (-20°C to 60°C)

Dimensions

CCD-FX228/FX230: Approx. 4 3/4 × 4 3/8 × 10 1/2 inches (w/h/d) (118 × 108 × 265 mm)
CCD-FX330: Approx. 4 3/4 × 3 8/8 × 10 7/8 inches (w/h/d) (118 × 108 × 274 mm)
Including projecting parts and controls

— Continued on next page —

8 VIDEO CAMERA RECORDER
SONY®



Mass

CCD-FX228/FX230: Approx. 1 lb 12 oz (820g)
CCD-FX330: Approx. 1 lb 13 oz (830g)
Excluding the battery pack and cassette
CCD-FX228/FX230: Approx. 2 lb 3 oz (1020g)
CCD-FX330: Approx. 2 lb 4 oz (1030g)
Including the battery pack NP-55 and cassette

Microphone

Electronic condenser microphone, monaural type

Supplied accessories

See page 7

AC power adaptor

Power requirements

110-240 V AC*, 50/60 Hz

Power consumption

AC-V25: 15W
AC-V25A: 17W
AC-V25C: 18 W

Output voltage

DC OUT
AC-V25: 7.5V, 1.2A
AC-V25A: 7.5V, 1.5A
AC-V25C: 7.5V, 1.6A
In operating mode
Battery charge terminal: 10 V, 1.1 A In charge mode

Application

Sony battery packs NP-55/
55H/66H/77H/77HD

Operating temperature

32 °F to 104 °F (0 °C to 40 °C)

Storage temperature

-4 °F to 140 °F (-20 °C to 60 °C)

Dimensions

Approx. 4 1/8 x 1 15/16 x 2 1/2 inches (w/h/d) (103 x 49 x 63 mm)
including projecting parts and controls

Mass

AC-V25: Approx. 10 oz (290g)
AC-V25A: Approx. 11 oz (320g)
AC-V25C: Approx. 10 oz (300g)

Design and specifications are subject to change without notice.

* Canadian Standard Association (CSA) certifies 120 V AC only.

VIEW FINDER ON CCD-FX228/FX230

- The CCD-FX228/FX230 have two kinds of view finders, these can be distinguished by the VF-44 board and VF-51 board.

Be careful not to use erroneous parts in replacing or repairing, because the replacement parts (CRT, etc.) of each board are different.

SAFETY CHECK-OUT

After correcting the original service problem, perform the following safety checks before releasing the set to the customer:

1. Check the area of your repair for unsoldered or poorly-soldered connections. Check the entire board surface for solder splashes and bridges.
2. Check the interboard wiring to ensure that no wires are "pinched" or contact high-wattage resistors.
3. Look for unauthorized replacement parts, particularly transistors, that were installed during a previous repair. Point them out to the customer and recommend their replacement.
4. Look for parts which, though functioning, show obvious signs of deterioration. Point them out to the customer and recommend their replacement.
5. Check the B+ voltage to see it is at the values specified.
6. Flexible Circuit board Repairing
 - Keep the temperature of the soldering iron around 270°C during repairing.
 - Do not touch the soldering iron on the same conductor of the circuit board (within 3 times).
 - Be careful not to apply force on the conductor when soldering or unsoldering.

SAFETY-RELATED COMPONENT WARNING!!

COMPONENTS IDENTIFIED BY MARK  OR DOTTED LINE WITH MARK  ON THE SCHEMATIC DIAGRAMS AND IN THE PARTS LIST ARE CRITICAL TO SAFE OPERATION. REPLACE THESE COMPONENTS WITH SONY PARTS WHOSE PART NUMBERS APPEAR AS SHOWN IN THIS MANUAL OR IN SUPPLEMENTS PUBLISHED BY SONY.

ATTENTION AU COMPOSANT AYANT RAPPORT À LA SÉCURITÉ!

LES COMPOSANTS IDENTIFIÉS PAR UNE MARQUE  SUR LES DIAGRAMMES SCHÉMATIQUES ET LA LISTE DES PIÈCES SONT CRITIQUES POUR LA SÉCURITÉ DE FONCTIONNEMENT. NE REMPLACER CES COMPOSANTS QUE PAR DES PIÈCES SONY DONT LES NUMÉROS SONT DONNÉS DANS CE MANUEL OU DANS LES SUPPLÉMENTS PUBLIÉS PAR SONY.

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There is the color reproduction standard frame at the back of the book.

SERVICE NOTE

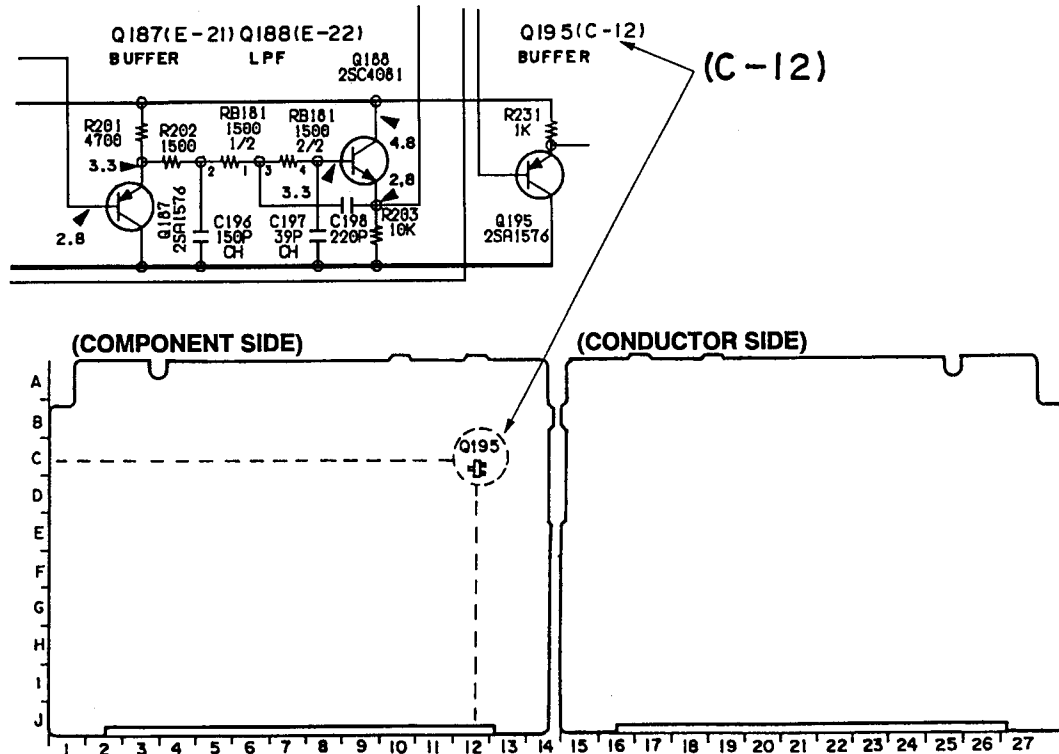
[PARTS LOCATION DIAGRAM RELATED TO POWER SUPPLY]

The parts location diagram for the power supply which are often checked and replaced when repairing the fuse and IC link and so on. (See page 4-10, 4-12, 4-28 and 4-29.)

This diagram is useful for repair.

[SEMICONDUCTOR LOCATION]

In this service manual, the mounted locations of the semiconductors (IC, transistor, diodes) are indicated in red in schematic diagrams. This enables to find the location on the board easily when servicing.



[HEAD CLEANING]

After an extended period of use the video image may become indistinct or may not appear at all during playback of a tape. The cause of this usually are dirty video heads. For remedy, cleaning of the heads is required.

Check for Head Clogs During Recording

- ① Use a blank tape, record a short section, then press the stop button to stop.
- ② Set to recording mode again.
- ③ If the [X] mark is flashing in the viewfinder at this time, head clogs are occurred.

Check During Playback of a Tape

- ① Play back a pre-recorded tape and display the image on a TV screen.
- ② If there is no sound and the image is unstable, no image appears on the screen, or tape transport is unstable, head clogs are occurred.

Remedy

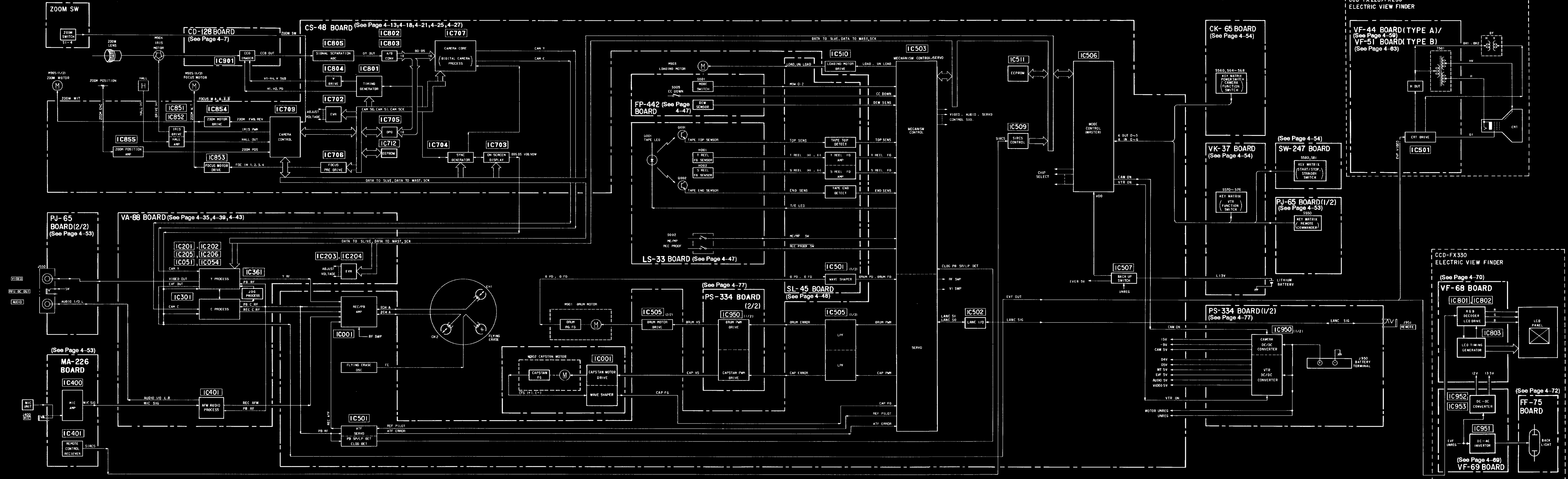
[Cleaning method using a cleaning tape]

- Use the Cleaning Tape. (Please follow the instructions attached to the cleaning tape.)

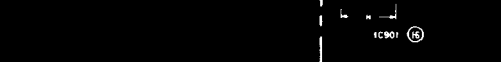
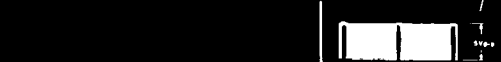
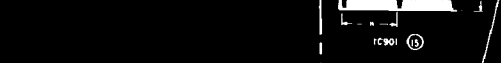
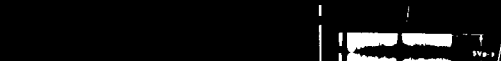
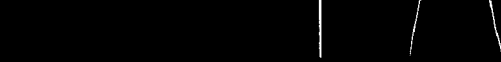
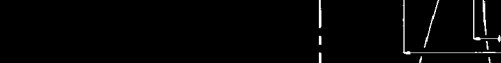
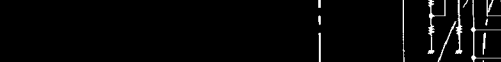
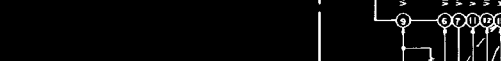
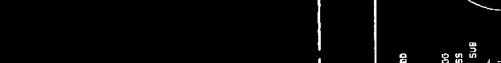
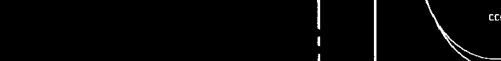
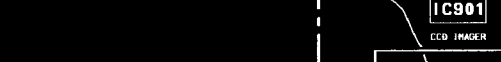
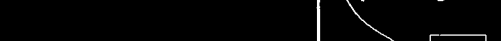
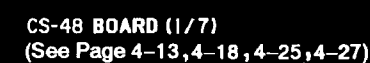
SECTION 3

BLOCK DIAGRAMS

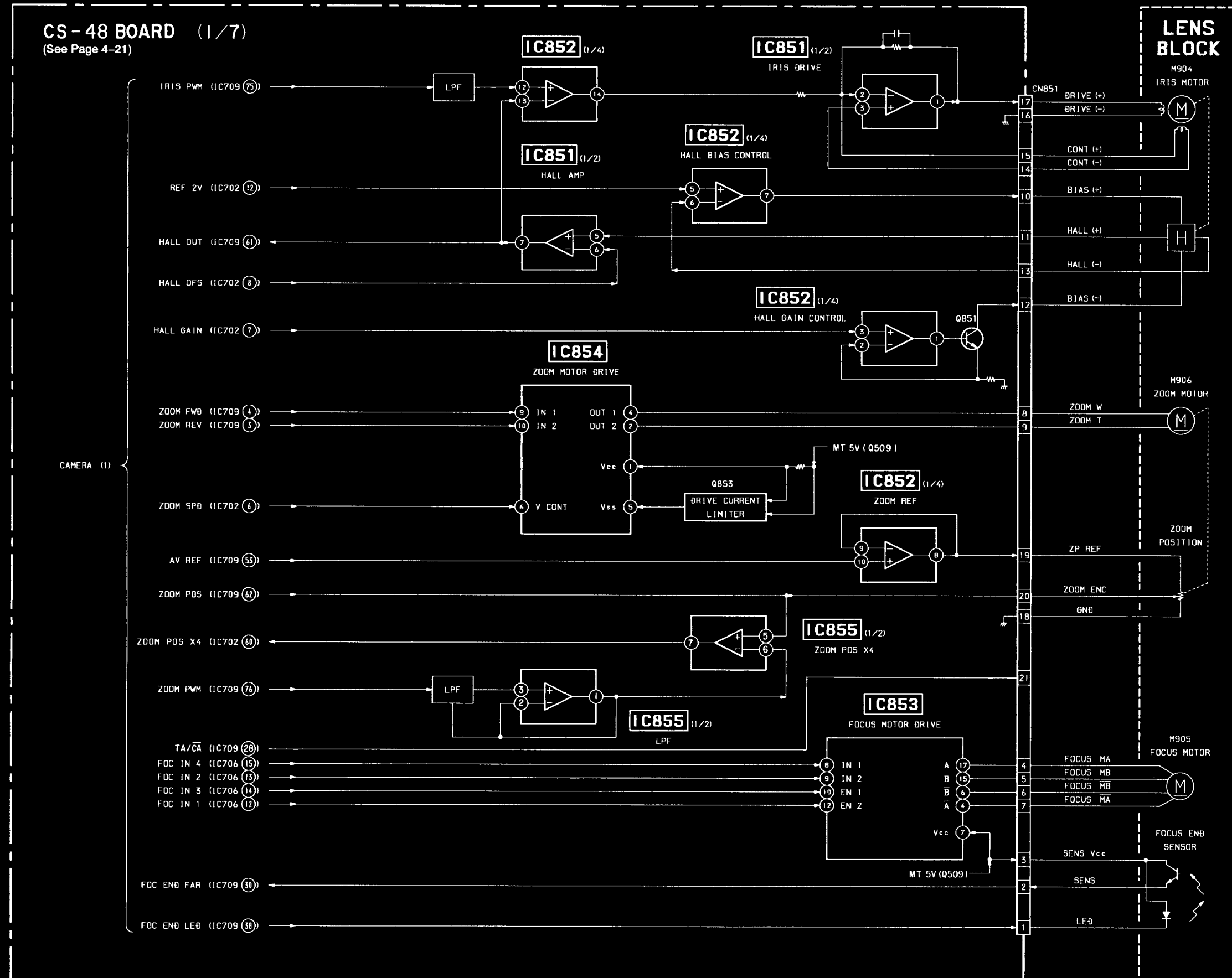
3-1. OVERALL BLOCK DIAGRAM



3-2. CAMERA (1) BLOCK DIAGRAM

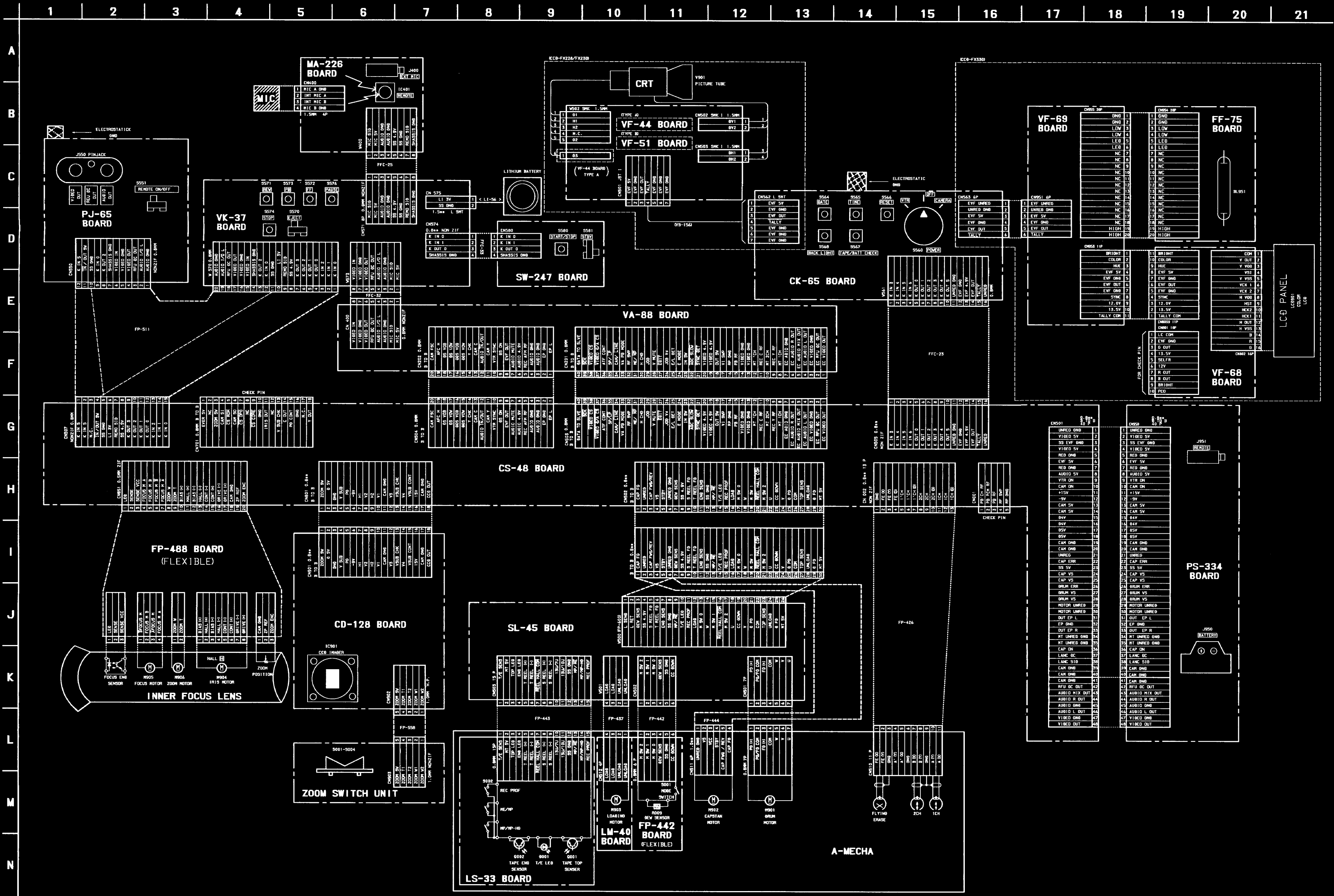


3-3. CAMERA (2) BLOCK DIAGRAM



SECTION 4
PRINTED WIRING BOARDS AND SCHEMATIC DIAGRAMS

4-1. FRAME SCHEMATIC DIAGRAM



4-2. PRINTED WIRING BOARDS AND SCHEMATIC DIAGRAMS

THIS NOTE IS COMMON FOR PRINTED WIRING BOARDS AND SCHEMATIC DIAGRAMS.
(In addition to this , the necessary note is printed in each block.)

• **For printed wiring boards.**

- — : indicated a lead wire mounted on the component side.
- : Pattern from the side which enables seeing.
(The other layer's patterns are not indicated)
- Circled numbers refer to waveforms.
- : Through hole

Caution:

Pattern face side: Parts on the pattern face side seen from the pattern face are indicated.
(Conductor Side)

Parts face side: Parts on the parts face side seen from the parts face are indicated.
(Component side)

• **For schematic diagrams.**

- Caution when replacing chip parts.
New parts must be attached after removal of chip.
Be careful not to heat the minuts side of tantalum capacitor, because it is damaged by the heat.
- Chip resistor are 1/16W unless otherwise noted.
k Ω : 1000 Ω , M Ω : 1000k Ω .
- All capacitors are in μ F unless otherwise noted, pF: μ μ F.
50V or less are not indicated except for electrolytics and tantalums.
- All variable and adjustable resistors have characteristic curve B, unless otherwise noted.
- : nonflammable resistor.
- : fusible resistor.
- : panel designation.
- : adjustment for repair. *
- : B+ Line. *
- - - : B- Line. *
- zzz : IN/OUT direction of (+, -) B LINE. *
- Circled numbers refer to waveforms. *

Note:
The components identified by mark Δ or dotted line with mark Δ are critical for safety. Replace only with part number specified.

Note:
Les composants identifiés par une marque Δ sont critiques pour la sécurité. Ne les remplacer que par une pièce portant le numéro spécifié.

When indicating parts by reference number, please include the board name.

• **Measuring conditions voltage value and waveform.**
(CAMERA block: CAMERA REC mode)

- The object is color bar chart of pattern box.
- Voltages are dc between ground and measurement points. *
- Readings are taken with a digital multimeter (DC 10M Ω). *
- Voltage variations may be noted due to normal production tolerances. *

1. Connection

2. Adjust the distance so that the output waveform of Fig. a and the Fig. b can be obtain.

Fig. a (Video output terminal output waveform)

Fig. b (Picture on monitor TV)

(VIDEO, SERVO/SYSTEM CONTROL, VIEW FINDER block: REC/PB mode)

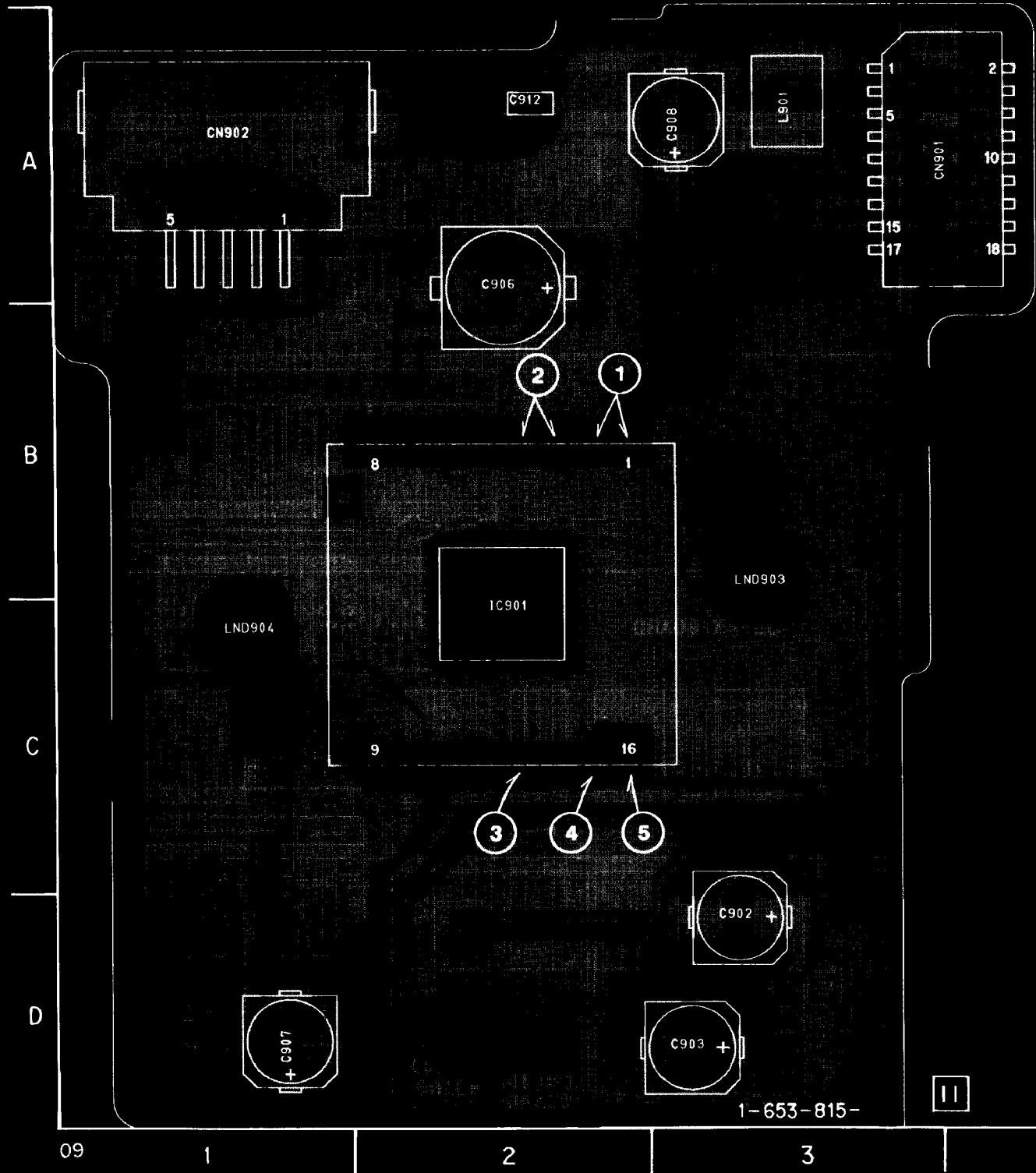
- Voltages are dc between ground and measurement points. *
- Readings are taken with a color-bar signal input. *
- Readings are taken with a digital multimeter (DC10M Ω). *
- Voltage variations may be noted due to normal production tolerances. *

*: indicated by the color red.

Note: Refer "3-1-2. Connecting the equipments" and "3-1-3. How to set the REC Mode" in VIDEO SECTION ADJUSTMENT. (See page 7-40, 41)

CD-128 (CCD IMAGER) PRINTED WIRING BOARD
— Ref. No. CD-128 BOARD: 3,000 Series —

CD-128 BOARD (COMPONENT SIDE)

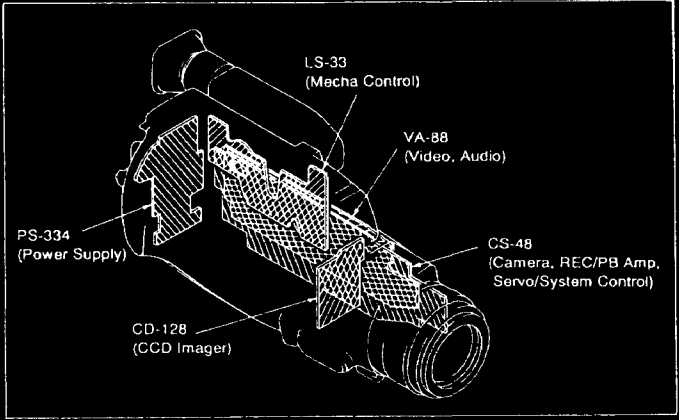


- **For printed wiring boards.**
- ■ : Pattern from the side which enables seeing.
(The inner two layer's patterns are not indicated)
- ○ : Through hole is omitted.

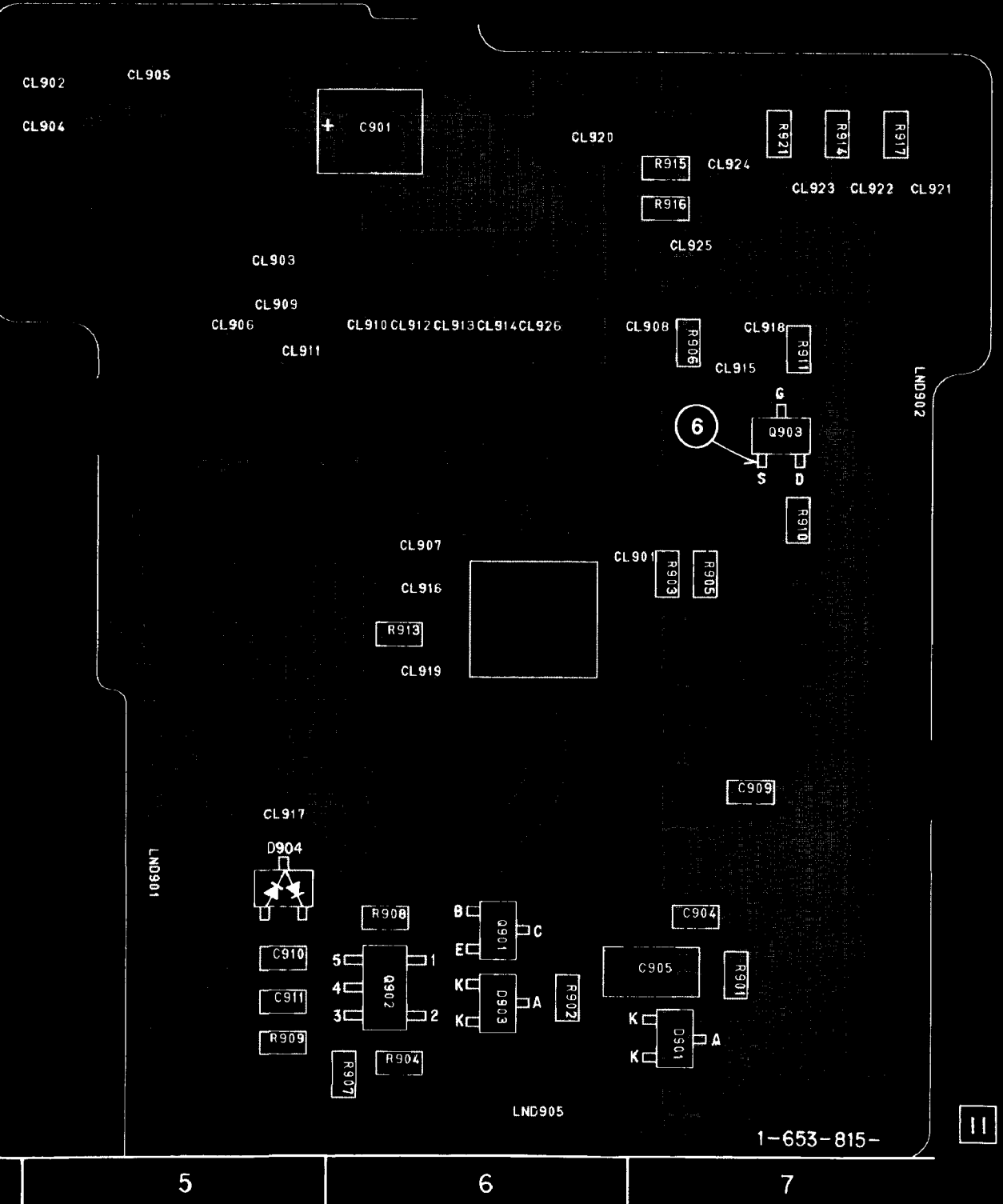
Caution:

Pattern face side: Parts on the pattern face side seen from the pattern face are indicated.
(Conductor Side)

Parts face side: Parts on the parts face side seen from the parts face are indicated.
(Component side)

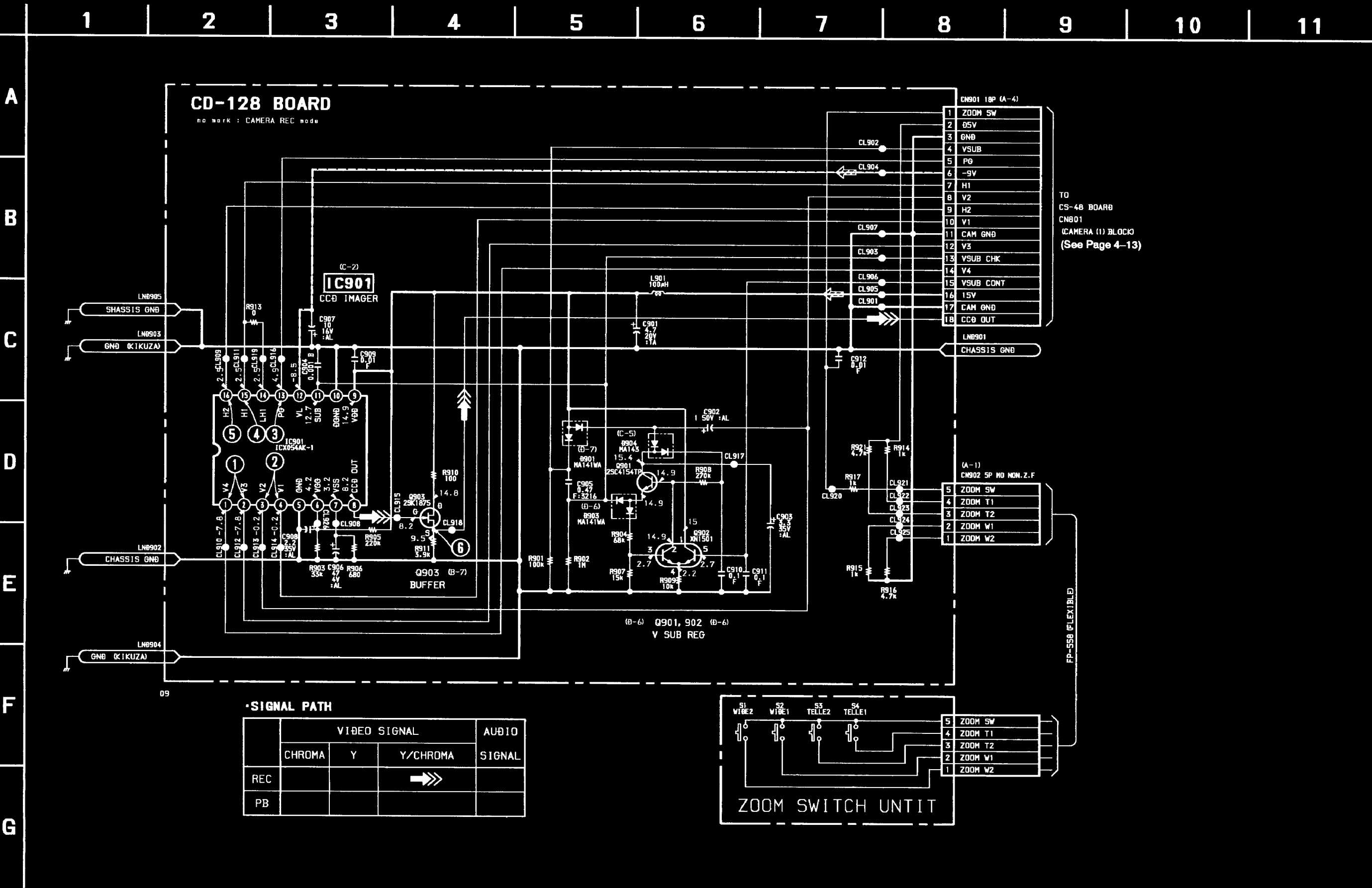


CD-128 BOARD (CONDUCTOR SIDE)



CD-128 (CCD IMAGER) SCHEMATIC DIAGRAM

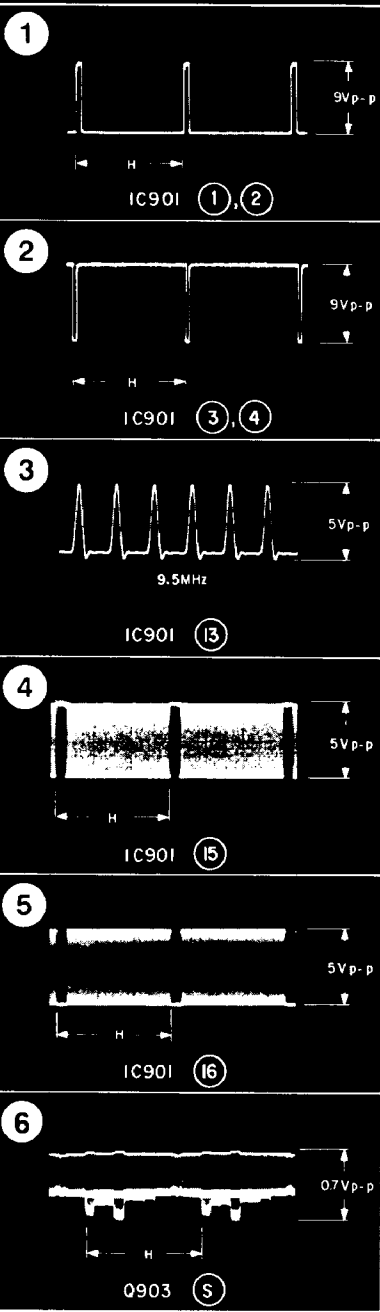
— Ref. No. CD-128 BOARD: 3,000 Series —



Note on the CCD Imager replacement

- Some of this units require the correction data by the CCD imager (IC901 on CD-128 board), some do not. The correction data is input in F page and addresses 1D to 2C of the camera micro processor (IC709 on CS-48 board), and also written on the CCD data label put on the shield case (upper) of the PS-334 board. The correction data is not required for the CCD imager supplied for repair. Therefore, when replacing the CCD imager to which the CCD data label is put, remove the CCD data label and input 00 to F page and addresses 1D to 2C of the camera micro processor. Refer to the camera adjustment for input method.
- The CCD imager is not mounted for the already mounted CD-128 board supplied as the repair parts. When replacing the CD-128 board, remove the CCD imager from the old board and install on the new board.
- Perform all adjustments of the camera block when the CCD imager has been replaced.
- Handle the CCD imager with attention such as MOS IC as it may be broken by static electricity in the structure. Also, prevent the receiving light section from dust attached and strong light.

CD-128BOARD



Checking Your Model Number

The instructions in this manual are for three models listed below. Before you start reading and operating, check your model number by looking at the bottom of your camcorder. The CCD-FX228 is the model used for illustration purposes. Otherwise, the model name is indicated in the illustrations. Any differences in operation are clearly indicated in the text, for example, "CCD-FX330 only".

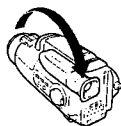
As you read through this manual, buttons and settings on the camcorder are shown in capital letters.
e.g. Turn the POWER switch to CAMERA.

Types of Differences

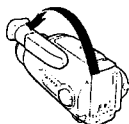
Model number	CCD-FX228	CCD-FX230	CCD-FX330
Viewfinder	monochrome	monochrome	color
Body color	gray	black	black
Wireless remote commander	x	x	○

After Taking the Camcorder out of the Box

Turn the viewfinder barrel in the direction of the arrow.

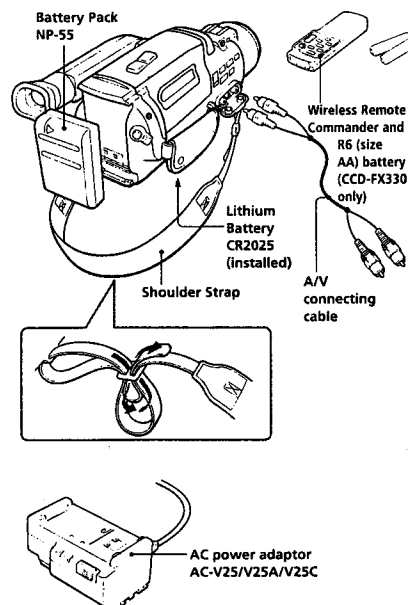


When storing your camcorder, turn the viewfinder barrel in the direction of the arrow.



Checking Supplied Accessories

Check that the following accessories are supplied with your camcorder.



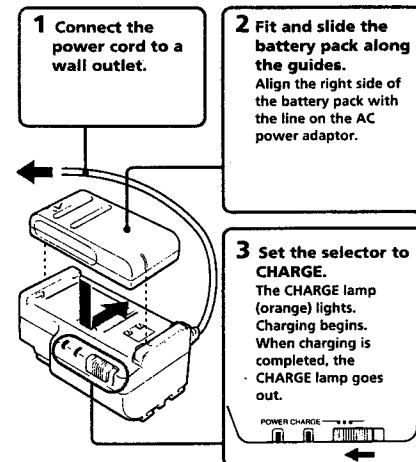
This mark indicates that this product is a genuine product related to our 8mm video equipment. When purchasing 8mm video equipment provided with this mark, we recommend that you purchase related 8mm video products provided with the same mark or products provided with our logotype mark.

Before You Begin

Charging and Installing the Battery Pack

Before using your camcorder, you first need to charge the supplied battery pack. To charge the battery pack, use the supplied AC power adaptor. Charge the battery pack on a flat place without vibration.

Charging the Battery Pack



Charging Time

Battery pack (NP-XX)	-55 (supplied)	-80	-77H	-66H	-60D	-55H
Charging time*	70	190	170	125	90	85

* Approximate minutes to charge an empty battery pack using the AC-V25/V25A/V25C. (Lower temperature require a longer charging time.)

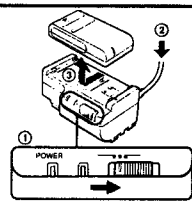
Important!

Before you recharge the battery, make sure the battery has been used up (discharged) completely (page 23).

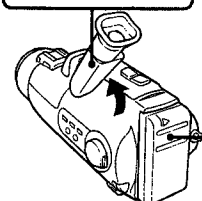
Installing the Battery Pack

1 Remove the Battery pack.

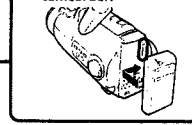
- Set the selector to the center position.
- Unplug the unit from the wall outlet.
- Slide the battery pack in the direction of the arrow.



2 Lift up the viewfinder.



3 Fit and slide the battery pack along the guides.



To remove the battery pack
While pressing BATT, slide the battery pack to the left.



Battery Life

Battery pack (NP-XX)	-55 (supplied)	-80	-77H	-66H	-60D	-55H
Typical*	35	95	90	65	45	40
Continuous**	65	170	160	120	85	75

CCD-FX330

Battery pack (NP-XX)	-55 (supplied)	-80	-77H	-66H	-60D	-55H
Typical*	30	85	85	60	40	35
Continuous**	55	150	145	105	75	65

* Approximate minutes when recording while you repeat recording start/stop and turning the power on/off. The actual battery life may be shorter.

** Approximate continuous recording time indoors.

Getting Started

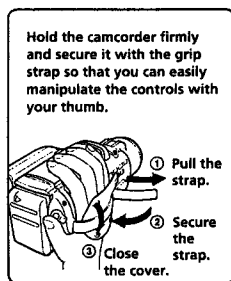
SECTION 1
GENERAL

CCD-FX228/FX230/FX330
This section is extracted from instruction manual.

Useful Information on Recording

For Hand-held Shots

You'll get better results holding the camcorder by following these suggestions:



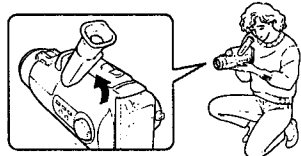
- Place your eye firmly against the viewfinder eyecup.
- Use the viewfinder frames as a guide to determine the horizontal plane.

Place your right elbow against your side.

Place your left hand under the camcorder to support it.

Stand with your feet apart to keep your body steady.

You can also record in a low position to get an interesting recording angle. Lift the viewfinder up for recording from a low position. (You can turn it to 180 degrees.)



Note on the Focus Range

If you cannot get a sharp focus while in extreme telephoto zoom, press the "W" side of the power zoom button until the focus is sharp. You can shoot a subject that is at least about 3 1/4 feet (1 m) away from the lens surface in the telephoto position, or about 1/2 inches (1 cm) in the wide-angle position.

Place the Camcorder on a Flat Surface or Use a Tripod

Keep the camcorder fixed by placing it on a table top or any other flat surface of suitable height. If you have a tripod for a still camera, you can also use it with the camcorder. Make sure the tripod screw is shorter than 9/32 in. (6.5 mm).

To Shoot in the Dark

We recommend that you use an optional video light. To get the best color, you must maintain a sufficient light level.

To Record from the Beginning of the Tape

Run the tape for about 15 seconds before recording. This prevents the camcorder from missing any start-up scenes when you play back the tape.

To Prevent Accidental Erasure

Slide the tab on the cassette to expose the red mark.



If you try to record with the red mark exposed, the caution lamp flashes on the viewfinder, and you cannot record.

To re-record on this tape, slide the tab back out so it covers the red mark.

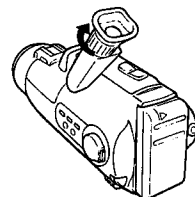
For Smooth Transition

To obtain smooth transition between scenes after the battery pack is replaced, leave the tape in the camcorder.

Using the Viewfinder as a Sports Finder - For model with the monochrome viewfinder (CCD-FX228/FX230 only)

With the Sports Finder, you can monitor the picture while your eyes are at a distance from the eyecup. You can shoot scenes while moving around.

When using the viewfinder as a Sports Finder, turn the viewfinder lens adjustment ring clockwise until it stops. CCD-FX228/FX230



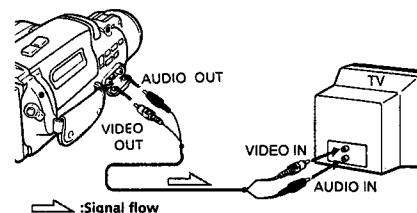
When returning to the normal viewfinder position, turn the viewfinder lens adjustment ring counterclockwise until the indicators in the viewfinder come into sharp focus.

Camera Recording

Connections for Playback

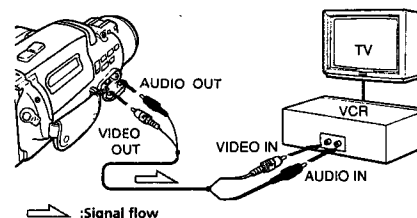
You can use this camcorder as a VCR by connecting it directly to your TV for playback. It is recommended to use the house current as the power source (page 20).

Connect the camcorder to your TV by using the supplied A/V connecting cable. Set the TV/VCR selector on the TV to VCR.



If a VCR is connected to the TV

Connect the camcorder to LINE IN on the VCR. Set the input selector on the VCR to LINE. Set the TV/VCR selector on the TV to VCR.



To connect a TV or a VCR without Video/Audio input jacks

Use an optional RFU adaptor.

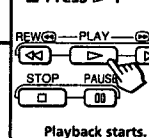
Playing Back a Tape

You can monitor the picture on a TV screen, after connecting the camcorder to a TV or VCR (page 16). You can also monitor the playback picture in the viewfinder. Make sure that a cassette is inserted.

- 1 Turn on the power. While pressing the green button on the POWER switch, turn it to PLAYER.



- 2 Press >.



Playing Back a Tape

To stop playback
Press □.

To rewind the tape
Press <<.

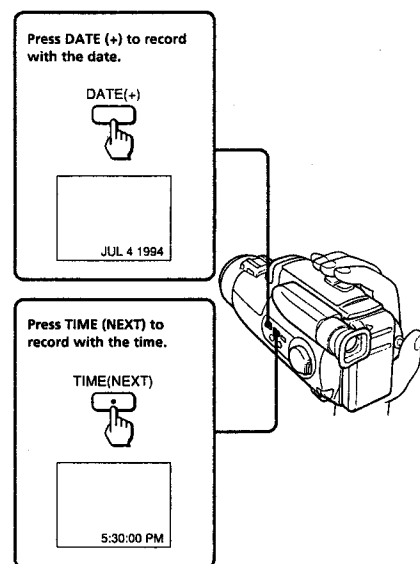
To advance the tape rapidly
Press >>.

To locate a scene (picture search)

Keep pressing << or >> during playback. To resume normal playback, release the button. The sound is muted in picture search mode.

Recording with the Date or Time

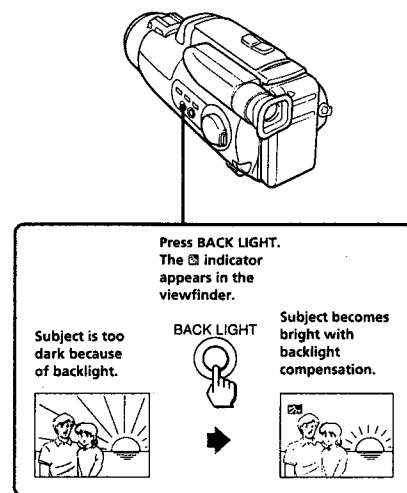
You can record the date or time displayed in the viewfinder with the picture. You cannot record the date and time at the same time. Except for the date or time indicator, no indicator in the viewfinder is recorded. The clock is set to the East Coast Standard Time at the factory. You can reset the clock (page 22).



To Stop Recording with the Date or Time
Press DATE (+) or TIME (NEXT) again. The date or time indicator disappears.

Shooting with Backlighting

When you shoot a subject with the light source behind the subject or a subject with a light background, use the BACK LIGHT function.



After shooting

Be sure to release this adjustment condition by pressing BACK LIGHT again. The [indicator] in the viewfinder disappears. Otherwise, the picture will be too bright under normal lighting condition.

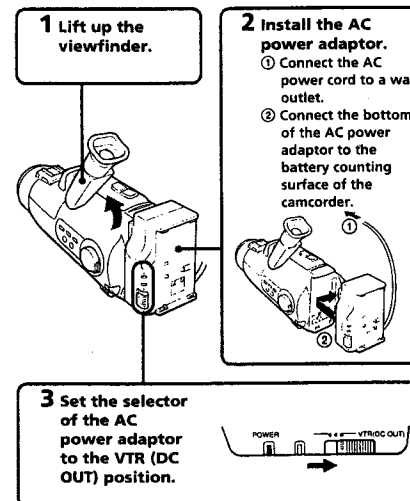
This function is also effective under the following conditions:

- On snow, e.g., at a ski resort
- At the beach under strong sunshine
- A subject with a light source nearby or a mirror reflecting light
- A white subject against a white background. Especially when you shoot a person wearing shiny clothes made of silk or synthetic fiber, his or her face tends to become dark if you do not use this function.

Using Alternative Power Source

You can choose any of the following power source for your camcorder: Battery pack (page 8), house current, and 12/24 V car battery.

Using House Current



To remove the adaptor

The adaptor is removed in the same way as the battery pack (page 9).

Using a Car Battery

Use the DCP-77 DC pack (not supplied). Connect the cord of the DC pack to the cigarette lighter socket of the car (12 V or 24 V).

Changing the Lithium Battery

Your camcorder is supplied with a lithium battery installed. The battery for the camcorder lasts for about one year under normal operation. When the lithium battery becomes weak or dead, the [indicator] flashes in the viewfinder for about five seconds when you set the POWER switch to CAMERA. In this case, **replace the battery with a Sony CR2025 or Duracell DL-2025 lithium battery.** Use of any other battery may present a risk of fire or explosion.

Note on Lithium Battery

The lithium battery has a positive (+) side and a negative (-) side as illustrated. Be sure to insert the lithium battery with the positive side facing out.



WARNING

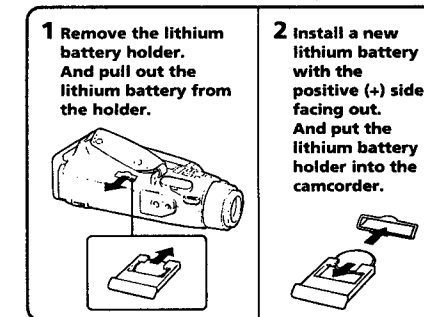
The battery may explode if mistreated. Do not recharge, disassemble, or dispose of in fire.

Caution

Keep the lithium battery out of the reach of children. Should the battery be swallowed, consult a doctor immediately.

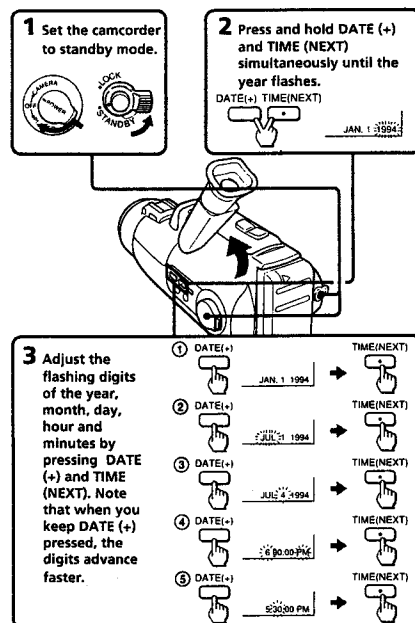
Changing the Lithium Battery

When replacing the lithium battery, keep the battery pack or other power source attached. Otherwise, you will need to reset the date and time.



Resetting the Date or Time

You can reset the date and time.



To Correct the Date and Time Settings

Press TIME (NEXT) repeatedly until the minute digits stop flashing. Then repeat steps 2 and 3.

To Check the Preset Date and Time

Press DATE (+) or TIME (NEXT). When you press the same button again, the indicator goes off.

Note on the setting of the year

When you set the year, each time you press DATE (+) the digits change as follows. 1994 → 1995 → ... → 2024

Note on the time indicator

The internal clock of this camcorder operates on a 12-hour cycle. 12:00 AM stands for midnight. 12:00 PM stands for noon.

Tips for Using the Supplied Battery Pack

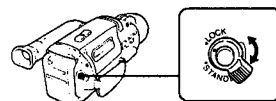
This section shows you how you can get the most out of your battery pack.

Use up Before Recharging

- Be sure to use up the battery before you recharge it. **Charging a usable battery reduces battery capacity.**
- If you finish recording before the ∞ indicator appears in the viewfinder, turn the POWER switch to PLAYER, and leave the camcorder on until the ∞ indicator flashes rapidly, for using up the battery.
- Battery capacity can be recovered if you fully discharge and charge the battery again.
- Do not continuously recharge a charged battery pack. This will cause the battery pack efficiency to deteriorate.

Effective Usages for Less Discharge Conserve Battery Power

Turn off the camcorder when you're not recording. Keep in mind that when you turn STANDBY up and position the subject, select an angle, or look through the viewfinder, the battery is being used. The battery is also being used when you insert or remove a tape.



Battery Life is Shorter in Cold Environments

Battery efficiency is decreased and the battery will be used up more quickly when you record in a cold environment.

When to Replace the Battery Pack

When the ∞ indicator in the viewfinder changes from slow flashing to rapid flashing, the battery needs to be charged. Turn the POWER switch to OFF before replacing the battery pack for smooth transition.

Note on the remaining battery indicator

The remaining battery indicator of the camcorder may indicate a different remaining capacity from that of the battery pack with its own indicator (not supplied). The indicator on the battery pack is more accurate.

Life of the Battery Pack

If the ∞ indicator flashes rapidly just after you turn on the camcorder with a fully charged battery pack, the battery pack should be replaced with a new, fully charged one.

Charging Temperature

The recommended temperature range when charging is 50°F to 86°F (10°C to 30°C). Lower temperatures require a longer charging time.

After Long Storage

Recharge the battery pack after a long period of storage. If the battery pack is charged fully but not used for a long time (about one year), it becomes discharged. Charge it again, but the first few times you use it the battery life will be shorter than normal. After several charging and discharging cycles, the battery life will recover its original capacity.

Useful Information

Always Carry Additional Batteries

Have sufficient battery pack power to do two to three times as much recording as you have planned.

How to Use the Switch on the Battery Pack

The switch is provided so that you can mark a charged battery. For example:

Set the switch to the "no mark" position when charging is completed.

Set the switch to the "red mark" position when the battery is used up.



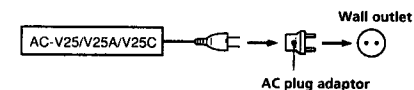
Using Your Camcorder Abroad

Each country has its own electricity and TV color systems. Before using your camcorder abroad, check the following points:

Power Sources

You can use your camcorder in any country with the supplied AC power adaptor within 110 V to 240 V AC, 50/60 Hz.

Use a commercially available AC plug adaptor, if necessary, depending on the design of the wall outlet.



Difference in Color Systems

This camcorder is an NTSC system-based camcorder. If you want to view the playback picture on a TV, it must be an NTSC system-based TV. When you want to use a PAL-M system based TV, you will need an NTSC/PAL-M transcoder. Check the following alphabetical list.

NTSC System Countries

Bahama Islands, Bolivia, Canada, Central America, Chile, Colombia, Ecuador, Jamaica, Japan, Korea, Mexico, Peru, Surinam, Taiwan, the Philippines, the U.S.A., Venezuela, etc.

PAL System Countries

Australia, Austria, Belgium, China, Denmark, Finland, Germany (former West Germany), Great Britain, Holland, Hong Kong, Italy, Kuwait, Malaysia, New Zealand, Norway, Portugal, Singapore, Spain, Sweden, Switzerland, Thailand, etc.

PAL-M System Country

Brazil

PAL-N System Countries

Argentina, Paraguay, Uruguay

SECAM System Countries

Bulgaria, France, Guyana, Hungary, Iran, Iraq, Monaco, Poland, former Soviet Union, etc.

Additional Information

Additional Information

Maintenance Information

Lens and Camcorder Cleaning

- Clean the lens with a soft brush to remove dust. If there are fingerprints on the lens, remove them with a soft cloth.
- Clean the camcorder body with a dry soft cloth, or a soft cloth lightly moistened with a mild detergent solution. Do not use any type of solvent which may damage the finish.

Video Head Cleaning

Clean the video heads regularly before you start recording or playing back to ensure normal recording and clear picture. When the caution lamp in the viewfinder flashes rapidly, or when playback pictures appear as below, the video heads may be contaminated.



If this happens, clean the video heads with the optional cleaning cassette Sony V8-25CLH. After checking the picture, if it is still "noisy", repeat the cleaning. (Do not repeat cleaning more than five times.)

Caution

Do not use a commercially available wet-type cleaning cassette. It may damage the video heads.

Note

If the V8-25CLH cleaning cassette is not available in your area, consult your nearest Sony dealer.

Moisture Condensation

If you bring the camcorder directly from a cold place to a warm place, moisture may condense inside the camcorder, on the surface of the tape, or on the lens. In this condition, the tape may stick to the head drum and be damaged, or the unit may not operate correctly. To prevent possible damage under these circumstances, the camcorder is furnished with moisture sensors. However, take the following precautions.

How to Prevent Moisture Condensation

When bringing the camcorder from a cold place to a warm place, put the camcorder in a plastic bag and leave it until it adapts to the room conditions.

- (1) Be sure to tightly seal the plastic bag containing the camcorder.
- (2) Remove when the air temperature inside it has reached the temperature surrounding it (in about one hour).

If Moisture Condenses Inside the Camcorder / On the Surface of the Tape

When the or indicator flashes in the viewfinder, this means that moisture has condensed inside the camcorder or there is moisture on the tape. If this happens, none of the functions except cassette ejection will work.

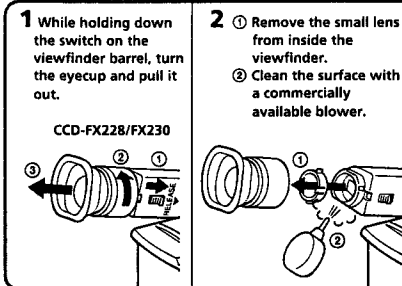
Eject the cassette, turn off the camcorder, and leave it with the cassette holder open in a dry place for at least one hour. You can use the camcorder again if the and indicator does not appear again.

If Moisture Condenses On the Lens

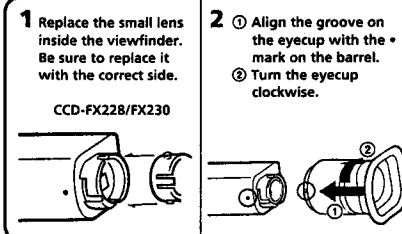
No indicator will appear, but the picture becomes dim. Turn off the power and do not use the camcorder for about one hour.

Removing Dust from Inside the Viewfinder

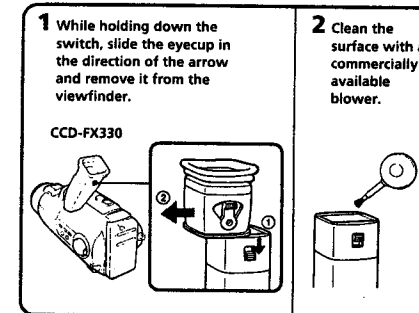
For model with the monochrome viewfinder (CCD-FX228/FX230 only)



To Reattach the eyecup



For model with the color viewfinder (CCD-FX330 only)



To reattach the eyecup

Slide the eyecup in the opposite direction of the arrow in the above illustration.

Additional Information

Additional Information

Precautions

Camcorder

- Operate the camcorder on 6.0 V (battery pack) or 7.5 V (AC power adaptor).
- For AC operation, use only the accessories recommended in this manual.
- Should any solid object or liquid get inside the casing, unplug the camcorder and have it checked by qualified personnel before operating it any further.
- Avoid rough handling, mechanical shock, or dropping the camcorder. Be particularly careful with the lens.
- Keep the POWER switch set to OFF when not using the camcorder.
- Do not wrap up the camcorder and operate it since heat may build up internally.
- Keep the camcorder away from strong magnetic fields or mechanical vibration.
- **When the camcorder is not to be used for a long time, disconnect the power source and remove the tape.** Periodically turn on the power, operate the camera and player sections and play back a tape for about three minutes.

AC Power Adaptor

- The AC power cord should be changed only at a qualified service shop.
- The nameplate indicating operating voltage, power consumption, etc. is located on the bottom.
- The unit is not disconnected from the AC power source as long as it is connected to the wall outlet, even if the unit itself has been turned off. A negligible amount of electric current will flow into the AC power adaptor even with the selector in the center position.
- Unplug the unit from the wall outlet when it is not to be used for a long time. To disconnect the cord, pull it out by the plug. Never pull the cord itself.
- Do not operate the unit if it is dropped or damaged or if its cord is damaged.
- Always keep the metal contacts clean.
- Do not disassemble the unit.
- While the unit is in use, particularly during charging, keep it away from AM receivers and video equipment because it will disturb AM reception and video operation.

- Do not place the unit in locations that are:

- Extremely hot or cold
- Very humid, dusty, dirty, or vibrating

If any difficulty should arise, unplug the unit and contact your nearest Sony dealer.

Battery Pack

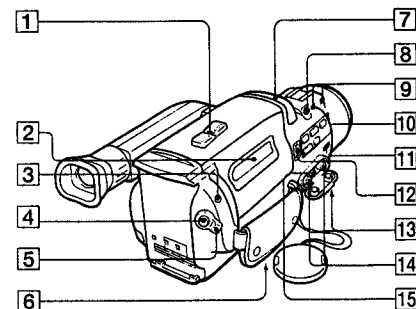
- A brand new battery pack is not charged. Before using the battery pack, charge it fully.
- **After using the camcorder, remove the battery pack from the camcorder, and place it in a cool place.** When the battery pack is attached to the camcorder, a small amount of current flows to the camcorder even when the POWER switch is set to OFF.
- Charge the battery immediately before using the camcorder. The battery pack is always discharging even when it is not in use.
- If the battery terminals are not clean, the battery duration will be shortened. If the terminals get dirty, you can clean them by repeatedly attaching and removing the battery pack. Alternately wipe the + and - terminals with a soft cloth or paper.
- Be sure that nothing metallic comes into contact with the metal parts of the terminals. If it does, a short may occur and the battery pack may be damaged.
- Be sure to observe the following:
 - **To prevent an accident caused by a short circuit, do not allow metal objects, such as a necklace, to touch the battery terminals. Carry the battery pack attached to the terminal cover.**



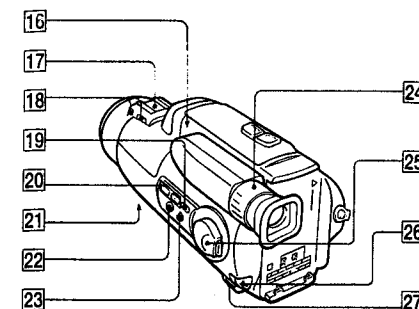
- Keep the battery pack away from fire.
- Keep the battery pack dry.
- Do not open or convert the battery pack.
- Do not expose the battery pack to any mechanical shock.

Additional Information

Identifying the Parts



- 1 Power zoom button
- 2 Cassette compartment
- 3 LANC Φ control jack
 - Φ stands for Local Application Control Bus System. The Φ control jack is used for controlling the tape transport of video equipment and peripherals connected to it. This jack has the same function as the jack indicated as CONTROL L or REMOTE.
- 4 START/STOP button
- 5 STANDBY switch
- 6 Lithium battery holder (21)
- 7 Built-in microphone
- 8 MIC jack (PLUG IN POWER)
 - Connect an optional external microphone. This jack also accepts a "plug-in-power" microphone.
- 9 Remote sensor
 - Aim the Remote Commander here for remote control.
- 10 Tape transport buttons
- 11 Remote Commander switch
- 12 Eject (cassette eject) button
- 13 Hooks for shoulder strap
- 14 Audio / Video output jacks
- 15 RFU DC OUT (RFU adaptor DC output) jack
 - To view the recorded picture on the TV that has only an antenna input, connect the RFU adaptor here.

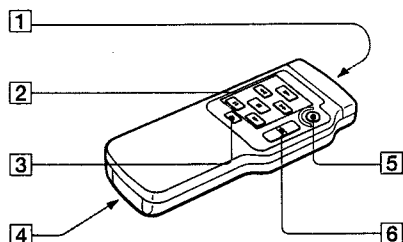


- 16 Camera recording/battery lamp
- 17 Accessory shoe
- 18 Remote sensor
 - Aim the Remote Commander here for remote control.
- 19 COUNTER RESET button
- 20 DATE (+) and TIME (NEXT) buttons
- 21 Tripod receptacle (bottom) (15)
- 22 BACK LIGHT button
- 23 TAPE / BATT CHECK button
 - Press to display the tape remaining indicator or battery remaining indicator in the viewfinder.
- 24 Viewfinder lens adjustment ring
- 25 POWER switch
- 26 BATT (battery eject) knob
- 27 Hooks for shoulder strap

Additional Information

Remote Commander (CCD-FX330 only)

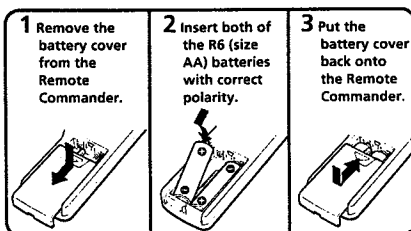
The buttons that have the same name on the Remote Commander and on the camcorder function identically.



- 1** Transmitter
Point toward the remote sensor to control the camcorder after turning on the POWER switch on the camcorder.
- 2** Tape transport buttons
- 3** DISPLAY button
Press to display the viewfinder screen indicators on the TV. To erase the indicators, press again.
- 4** R6 (size AA) battery holder
- 5** START/STOP button
- 6** Power zoom button
The zooming speed is unchangeable on the Remote Commander.

Preparing the Remote Commander

Preparing the Remote Commander:
To use the Remote Commander, you must insert two R6 (size AA) batteries. Use the supplied R6 (size AA) batteries.

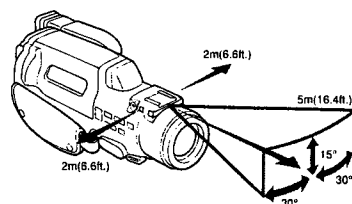


Note on battery life

Note on battery life
The batteries for the Remote Commander last about 6 months under normal operation. When the batteries become weak or dead, the Remote Commander does not work.

To avoid damage from possible battery leakage
Remove the batteries when you will no use the Remote Commander for a long time.

Remote Control Direction

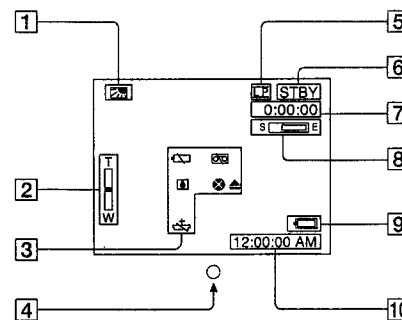


Notes on the Remote Commander

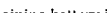
- Keep the remote sensor away from strong light sources such as direct sunlight or illumination. Otherwise, the remote control may not be effective.
- Be sure that there is no obstacle between the remote sensor and the Remote Commander.
- This camcorder works at commander mode VTR 2. The commander modes (1,2 and 3) are used to distinguish this camcorder from other Sony VCRs to avoid remote control misoperation. If you use another Sony VCR at commander VTR 2, we recommend you change the commander mode or cover the remote sensor of the VCR with black paper.

Operation indicators

For details on each indicator, refer to pages indicated in the parentheses.

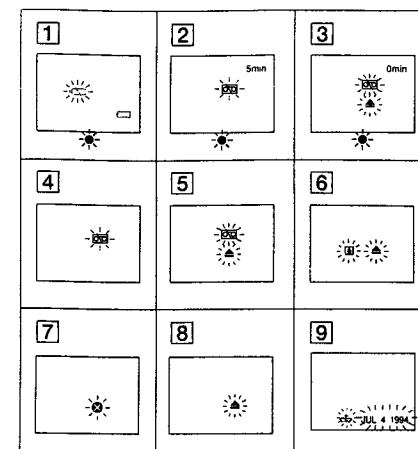


- [1]** Back Light indicator (19)
- [2]** Power zoom indicator
- [3]** Warning indicators (43)
- [4]** Recording lamp / Battery lamp
- [5]** Light up when playing back a tape recorded in LP mode.
- [6]** Tape transport mode
- [7]** Tape counter
- [8]** Remaining tape indicator

- [9]** Remaining battery indicator (23)

- [10]** Date or Time (22)

Warning Indicators

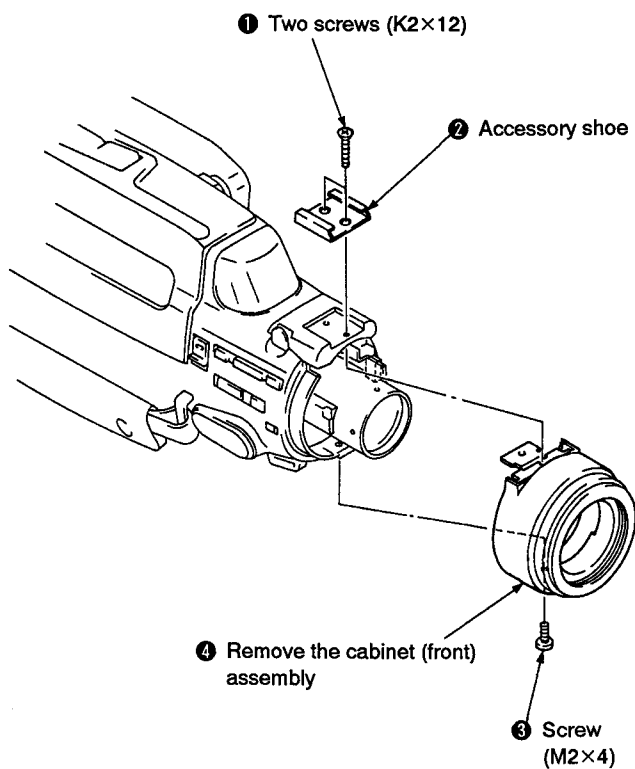
If indicator flash in the viewfinder or a caution on the camcorder flashes, check the following:



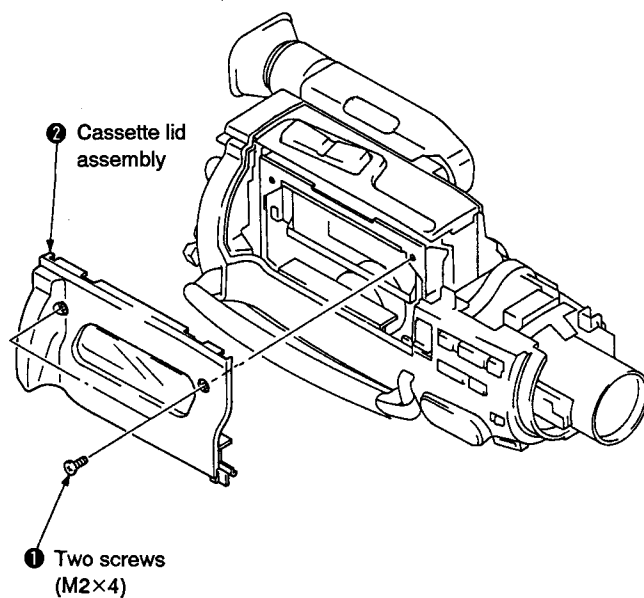
- 1 The battery is weak or dead.
Slow flashing: The battery is weak.
Fast flashing: The battery is dead.
- 2 The tape is near the end.
The flashing is slow.
- 3 The tape has run out.
The flashing becomes rapid.
- 4 No tape has been inserted.
- 5 The tab on the tape is out (red).
- 6 Moisture condensation has occurred. (27)
- 7 The video heads may be contaminated. (26)
- 8 Some other trouble has occurred.
Disconnect the power source and contact your Sony dealer or local authorized facility.
- 9 The lithium battery is weak or is not installed. (21)

SECTION 2 DISASSEMBLY

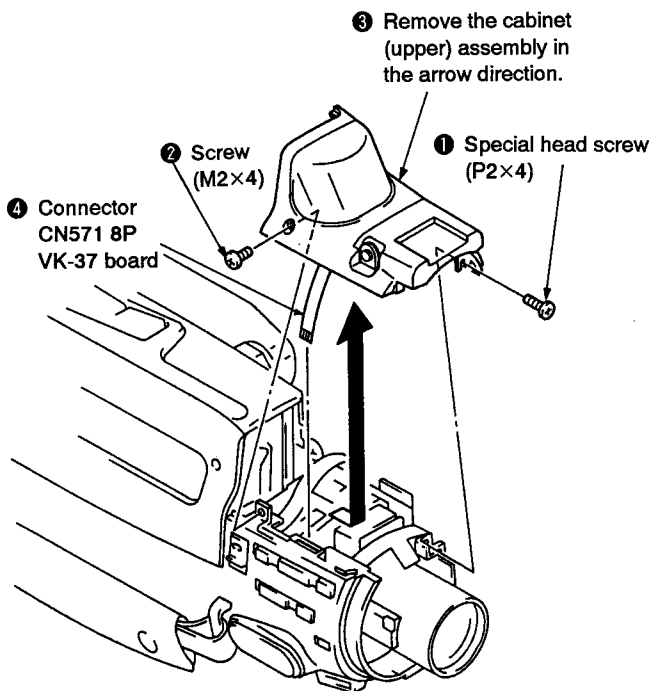
2-1. REMOVAL OF CABINET (FRONT) ASSEMBLY



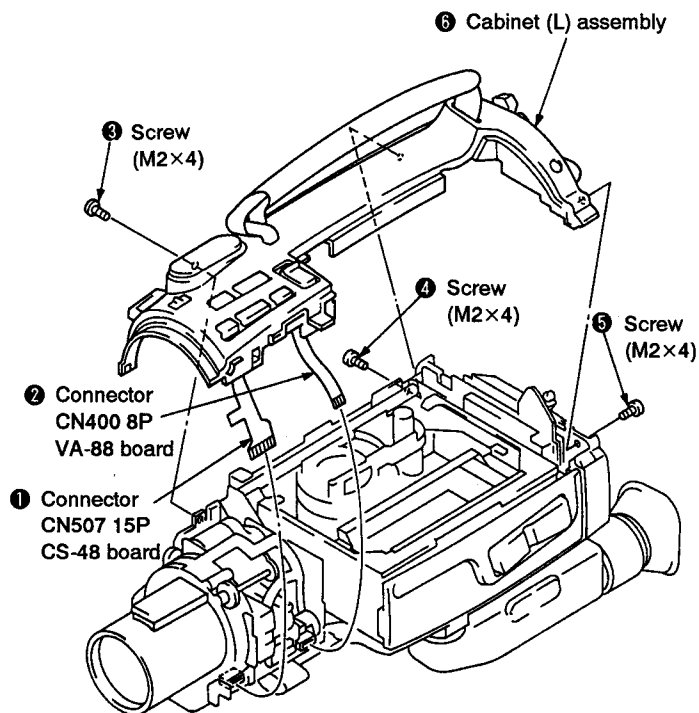
2-3. REMOVAL OF CASSETTE LID ASSEMBLY



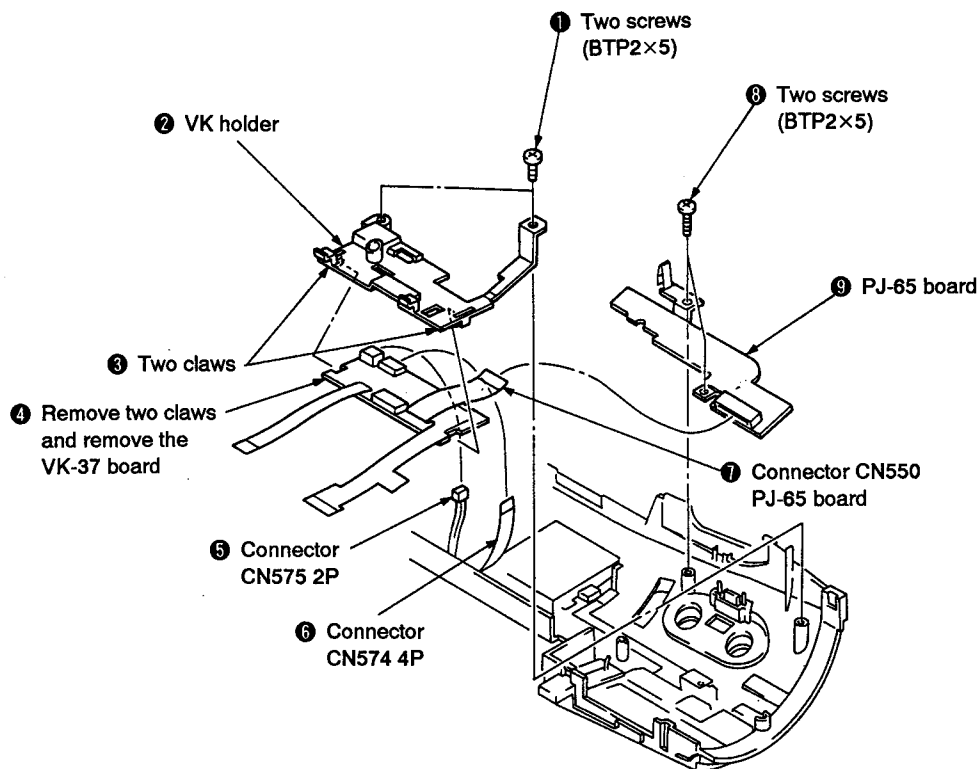
2-2. REMOVAL OF CABINET (UPPER) ASSEMBLY



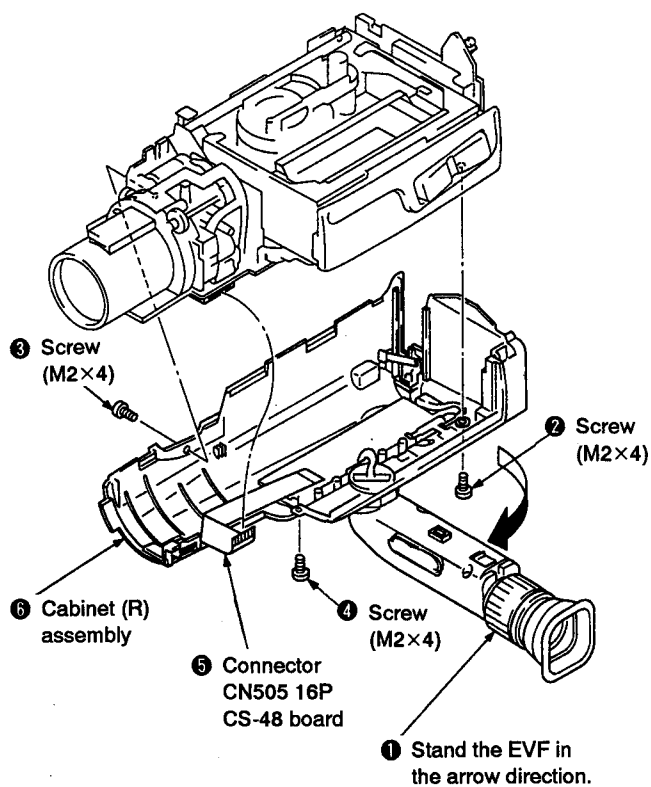
2-4. REMOVAL OF CABINET (L) ASSEMBLY



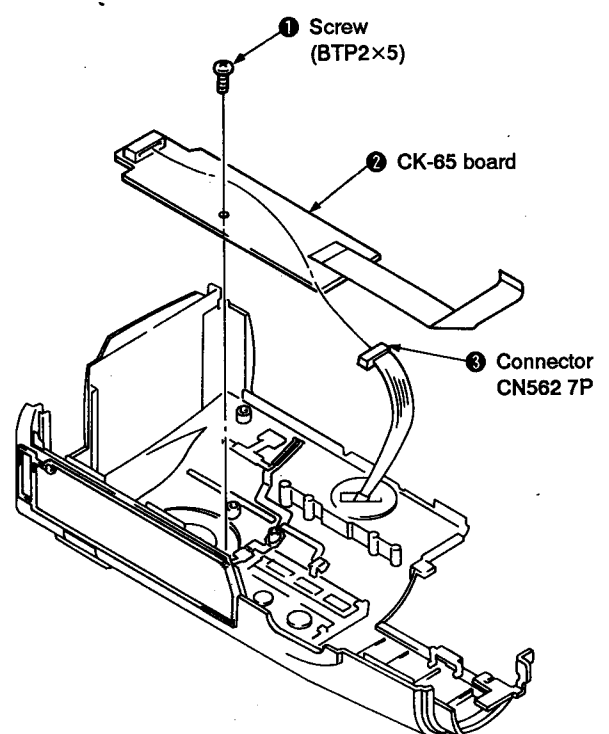
2-5. REMOVAL OF VK-37 AND PJ-65 BOARDS



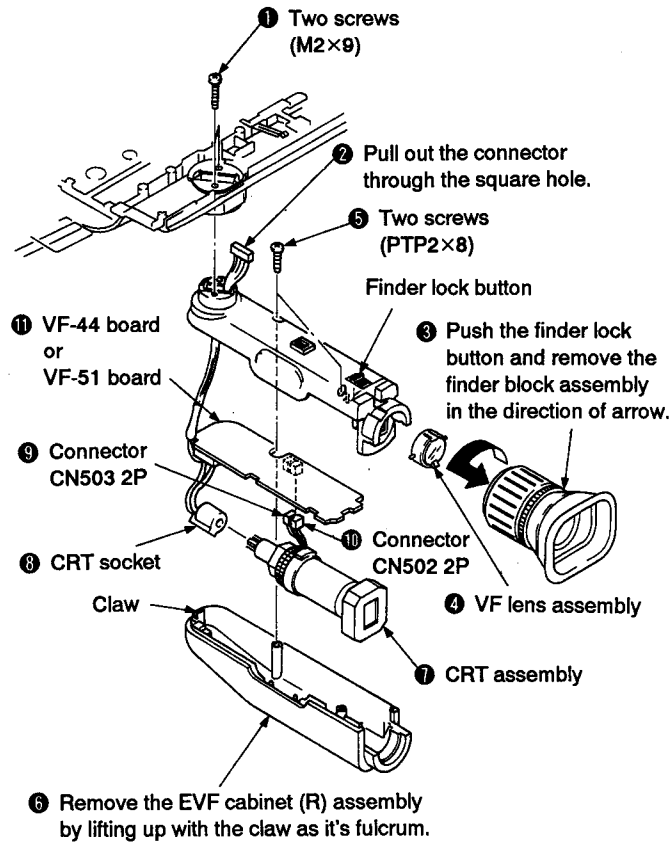
2-6. REMOVAL OF CABINET (R) ASSEMBLY



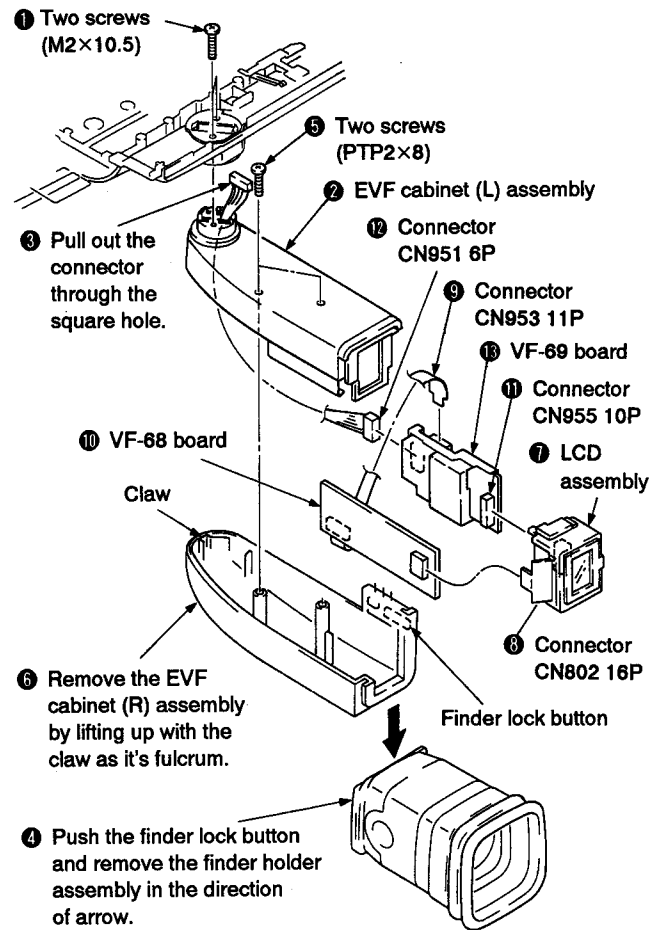
2-7. REMOVAL OF CK-65 BOARD



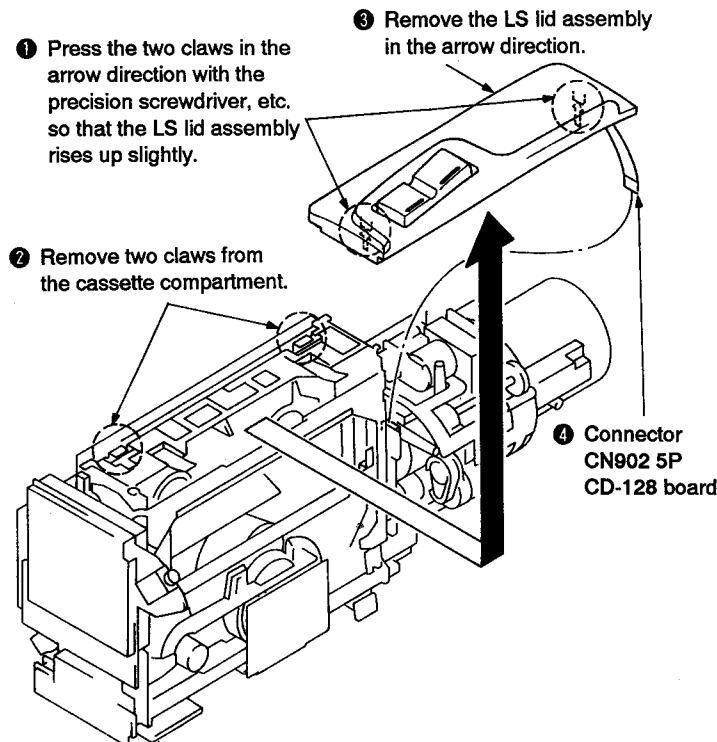
2-8. REMOVAL OF EVF ASSEMBLY (FX228/FX230) (VF-44 BOARD: TYPE A) (VF-51 BOARD: TYPE B)



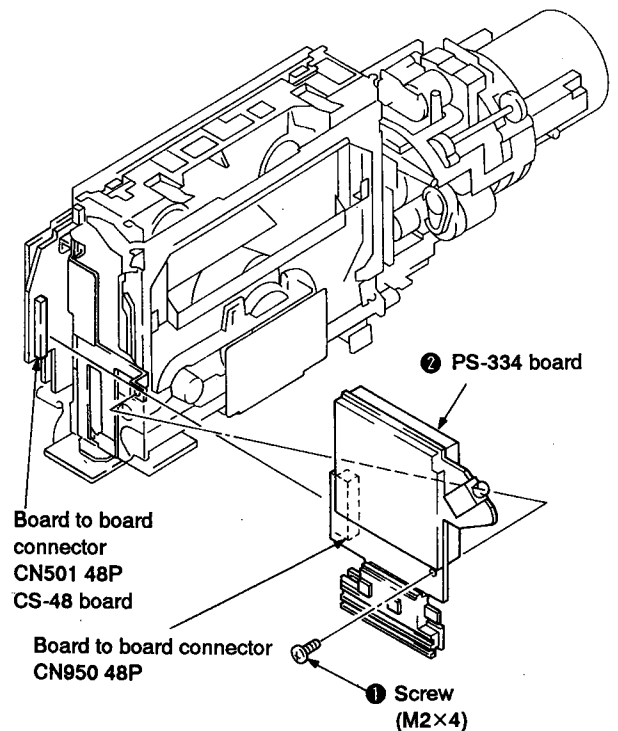
2-8. REMOVAL OF EVF ASSEMBLY (FX330) (VF-68/69 BOARDS)



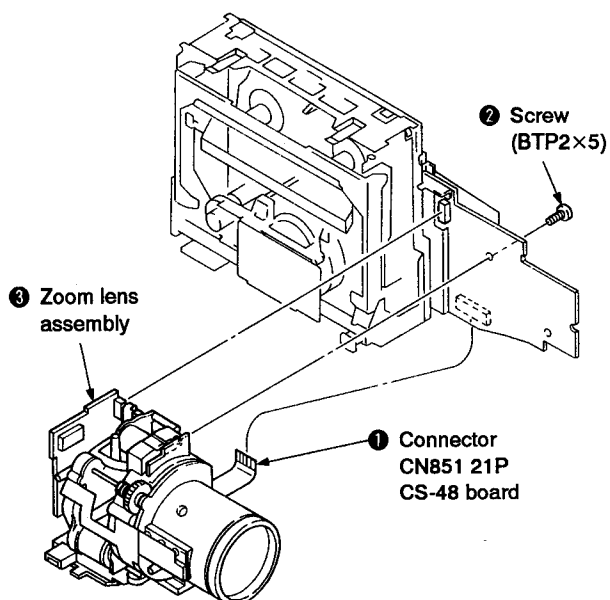
2-9. REMOVAL OF LS LID ASSEMBLY



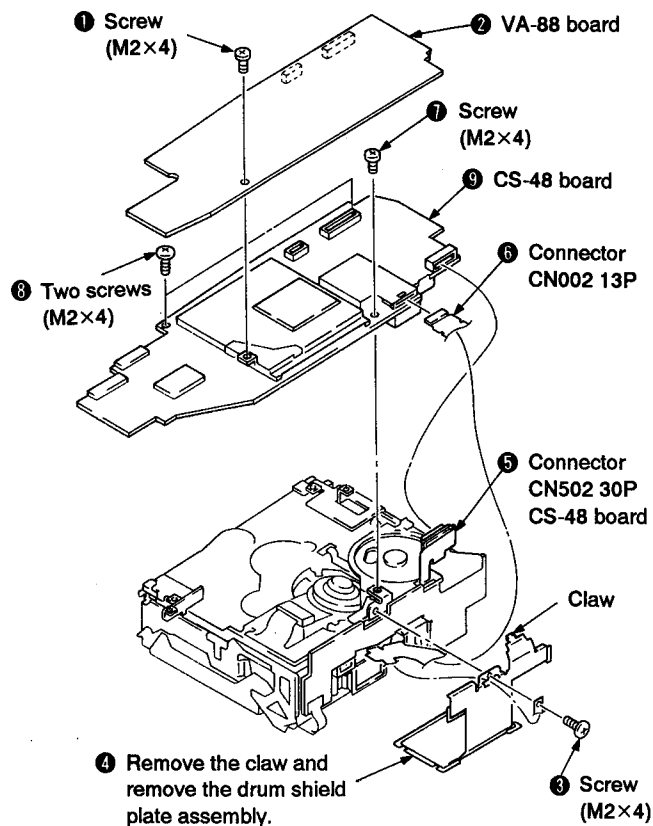
2-10. REMOVAL OF PS-334 BOARD



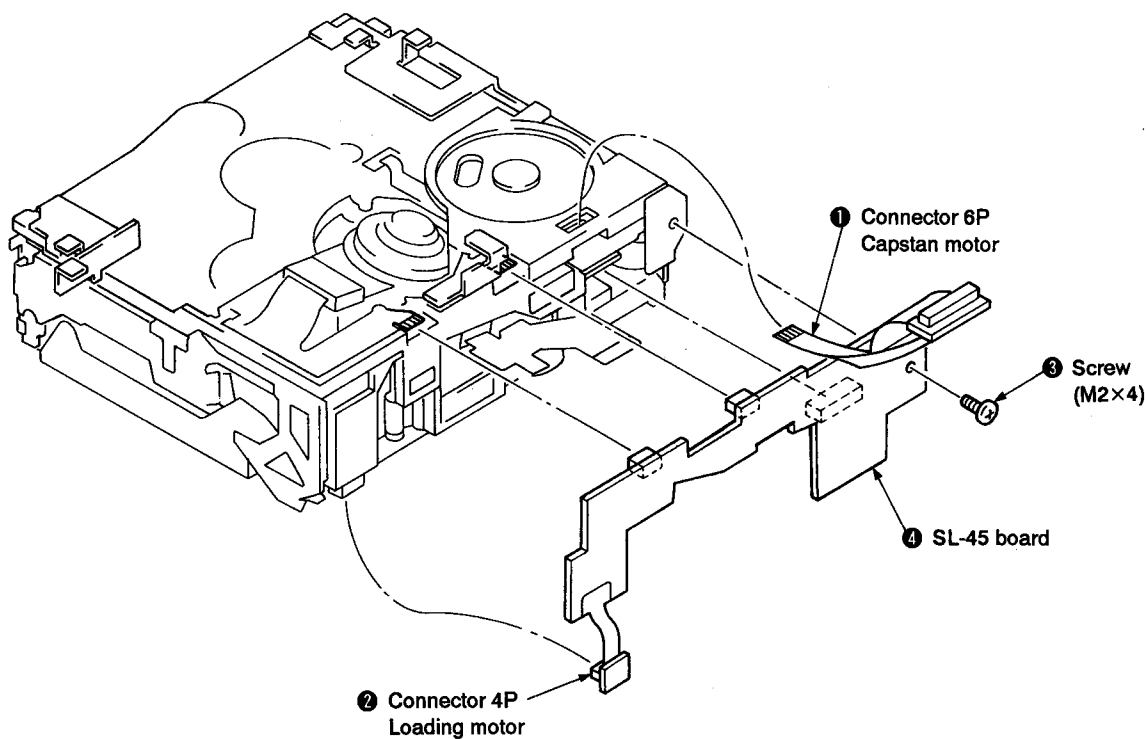
2-11. REMOVAL OF ZOOM LENS ASSEMBLY



2-12. REMOVAL OF VA-88 AND CS-48 BOARDS

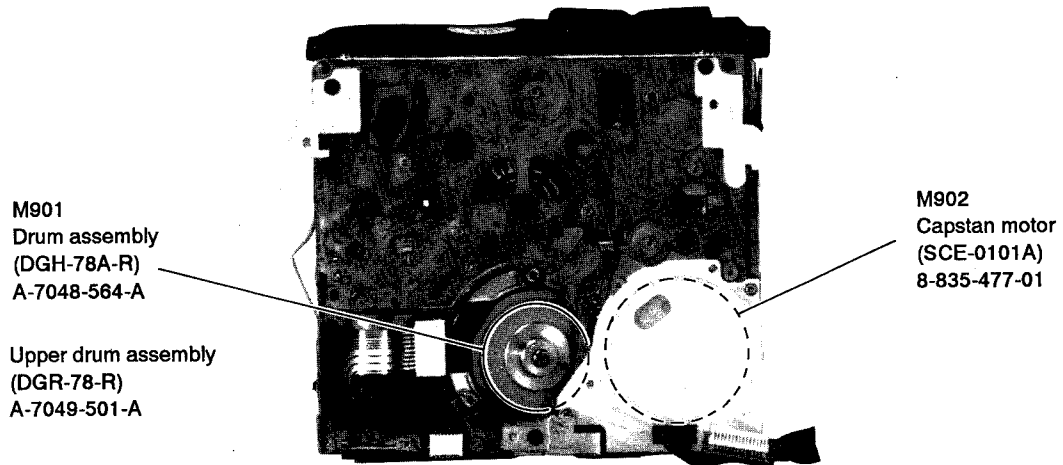


2-13. REMOVAL OF SL-45 BOARD

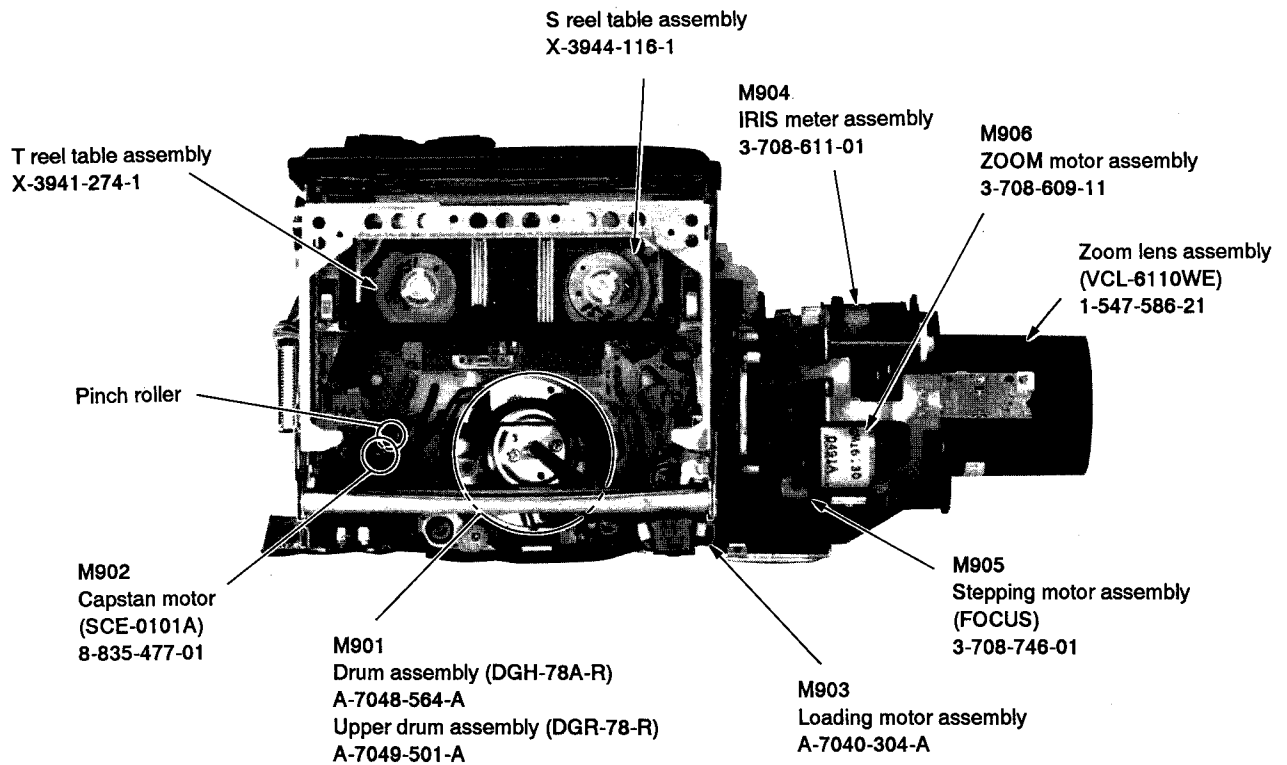


2-14. INTERNAL VIEWS

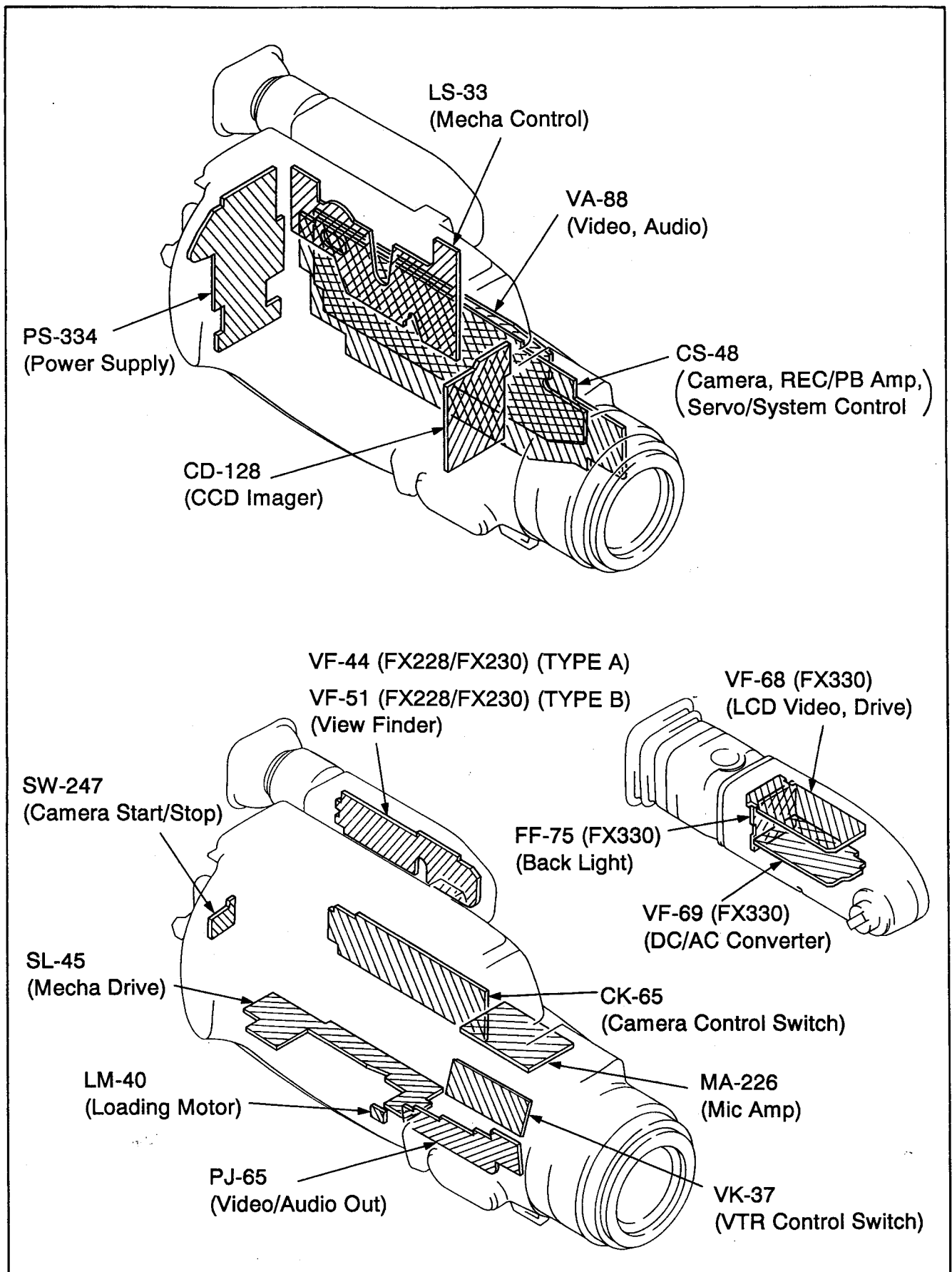
— Right side —



— Left side —

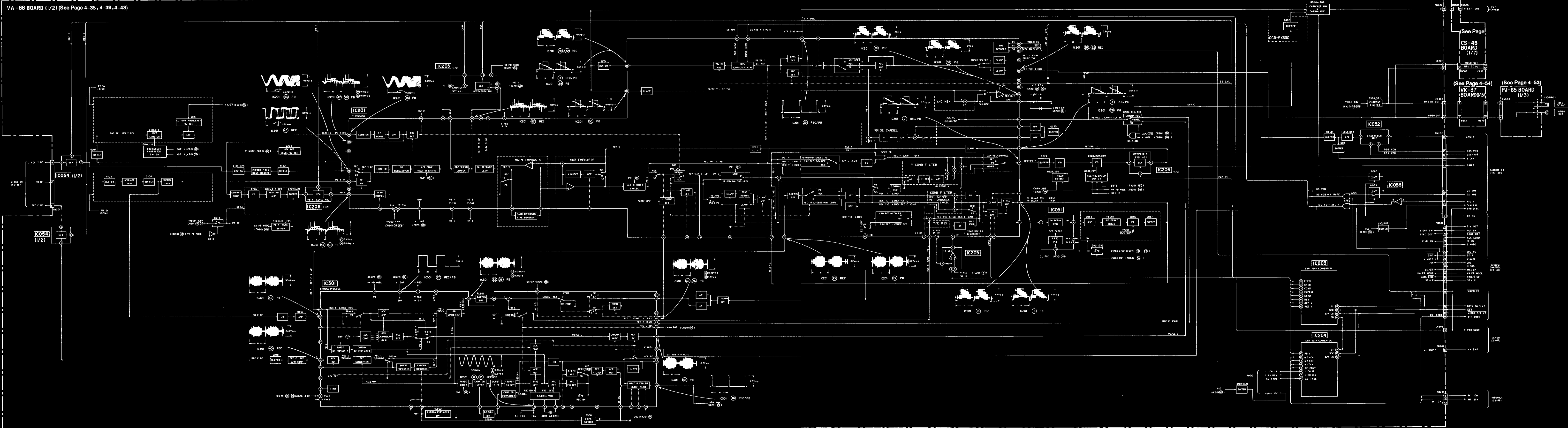


2-14. CIRCUIT BOARDS LOCATION

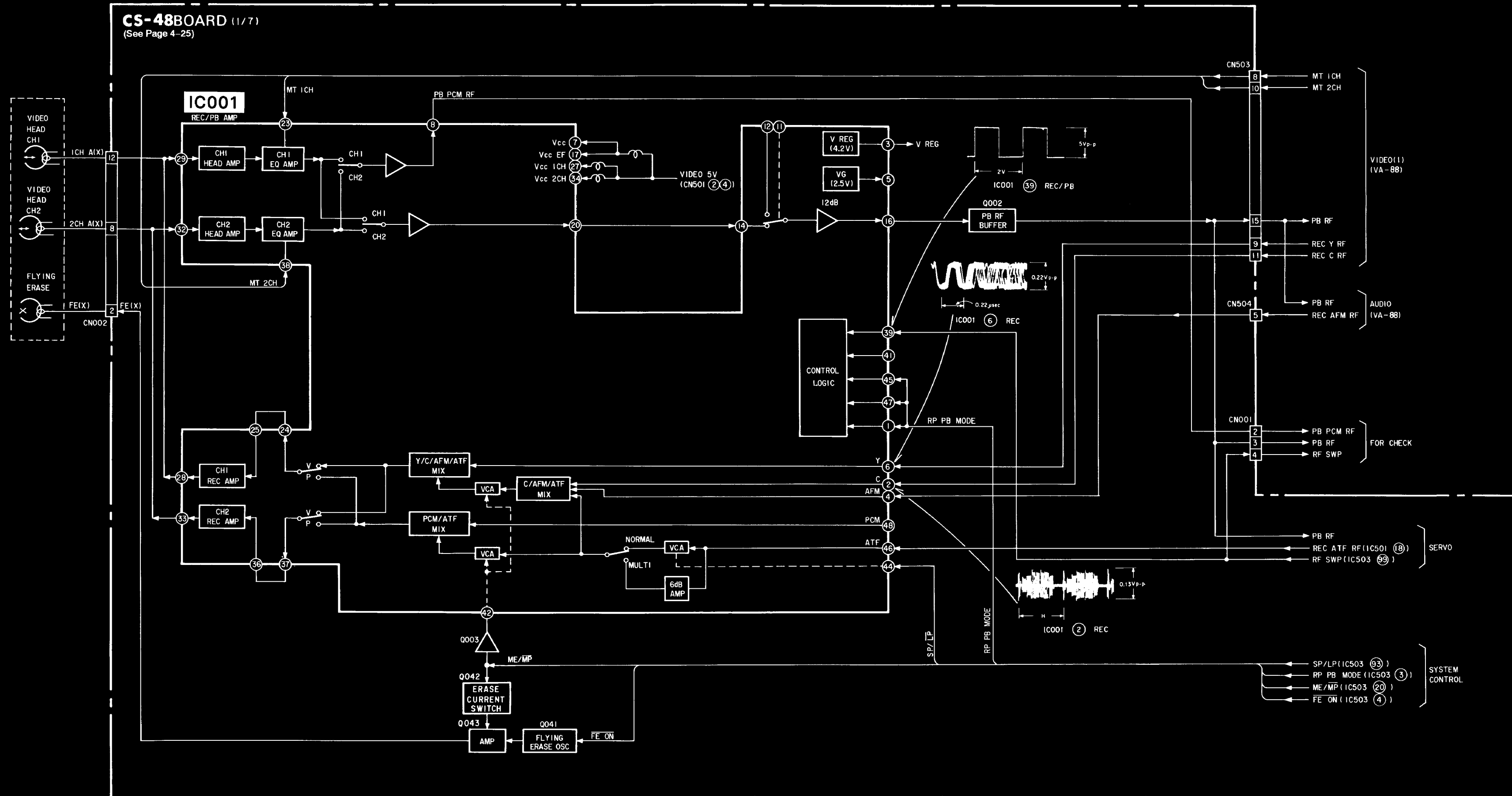


3-4. VIDEO (1) BLOCK DIAGRAM

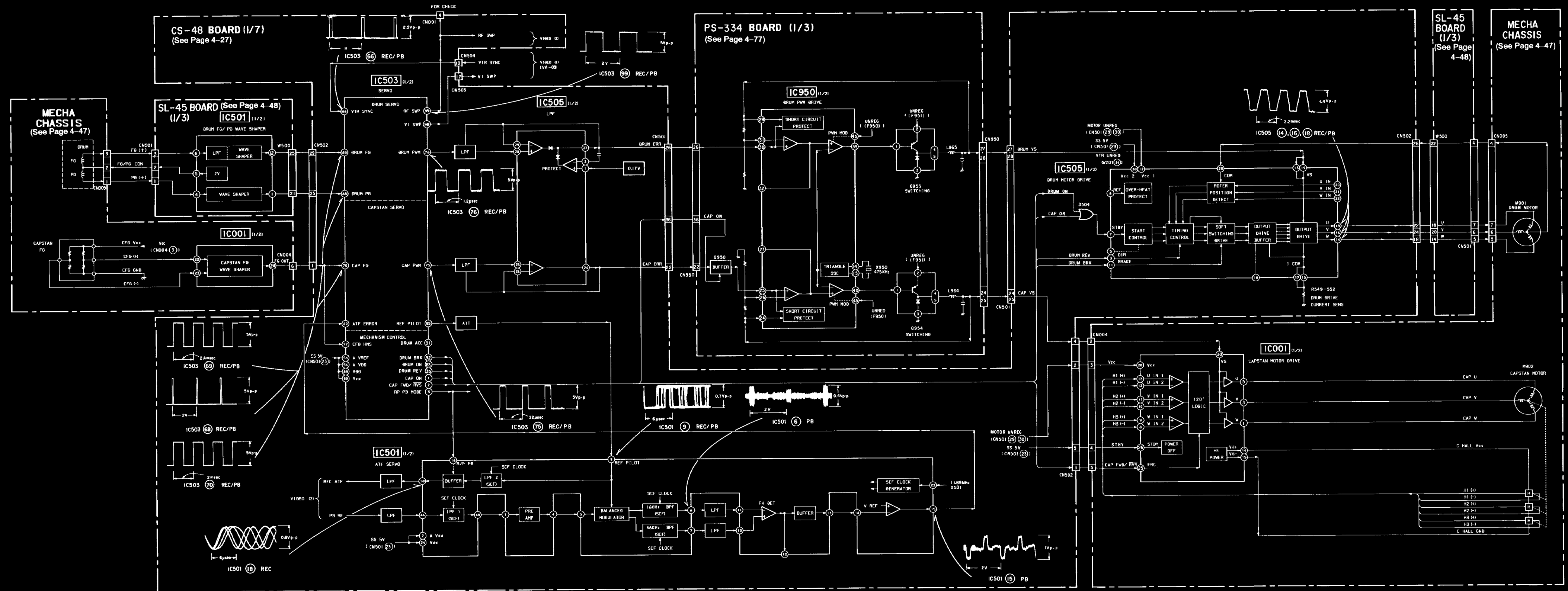
VA - 88 BOARD (1/2) (See Page 4-35, 4-39, 4-43)

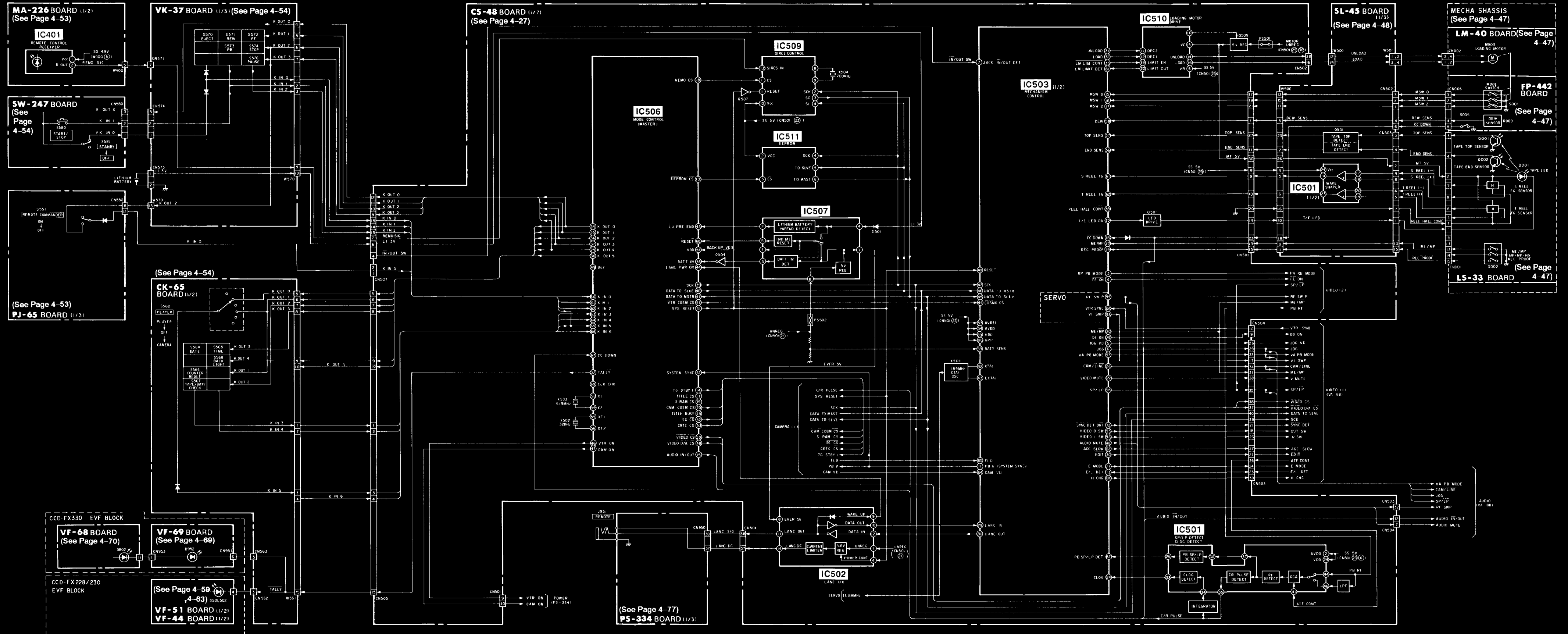


3-5. VIDEO (2) BLOCK DIAGRAM



3-6. SERVO BLOCK DIAGRAM





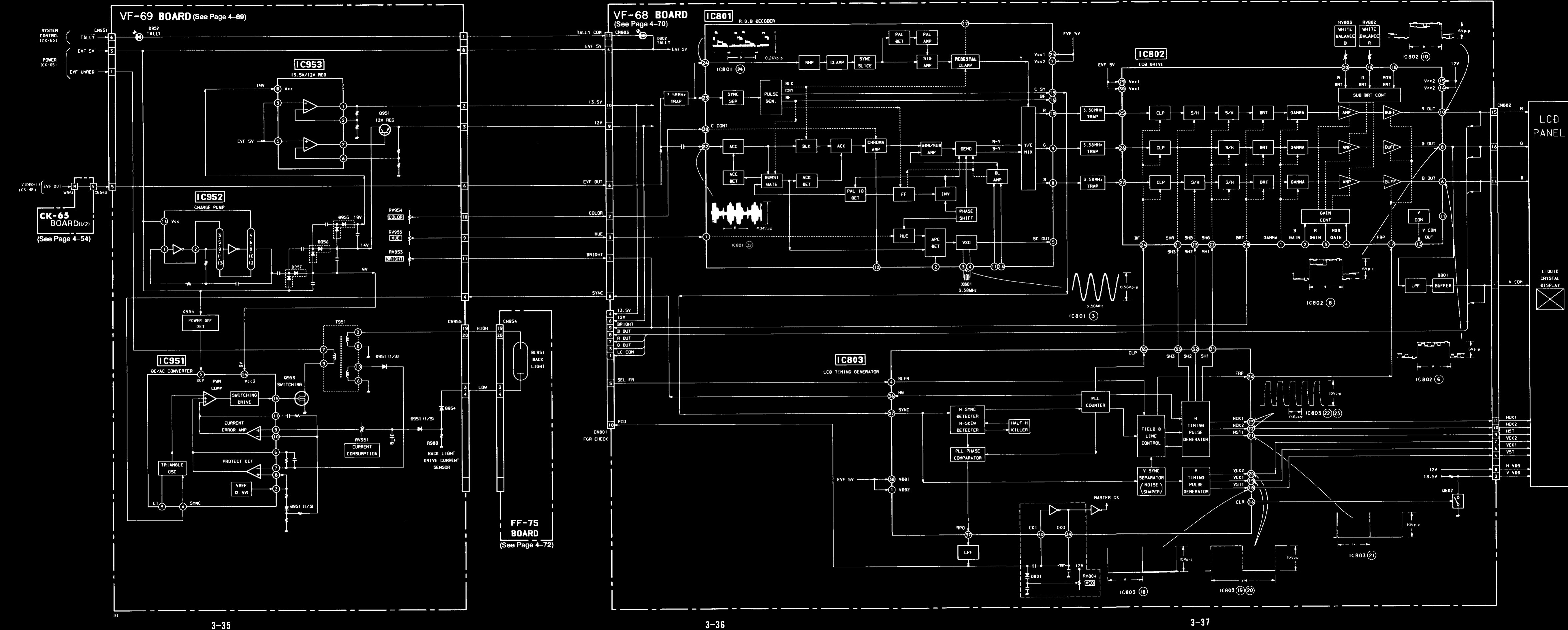
3-29



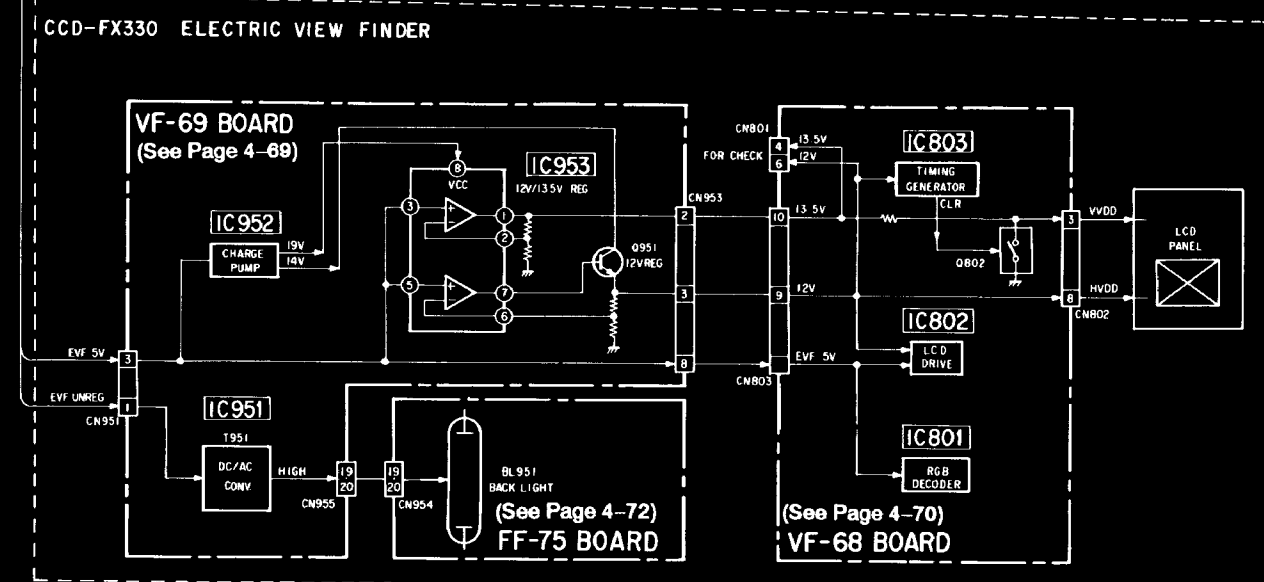
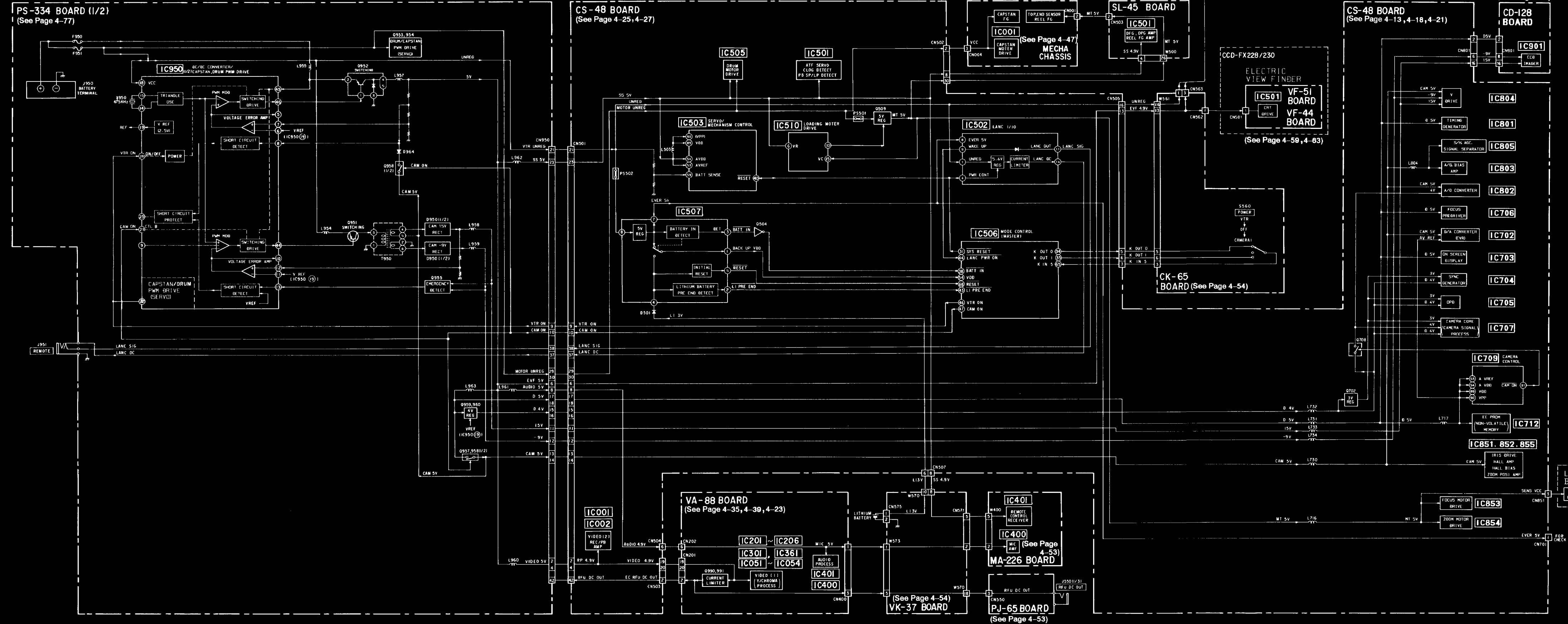


3-33

3-11. COLOR EVF BLOCK DIAGRAM (CCD-FX330)



3-12. POWER BLOCK DIAGRAM



CS-48 (CAMERA, REC/PB AMP, SERVO/SYSTEM CONTROL) PRINTED WIRING BOARD

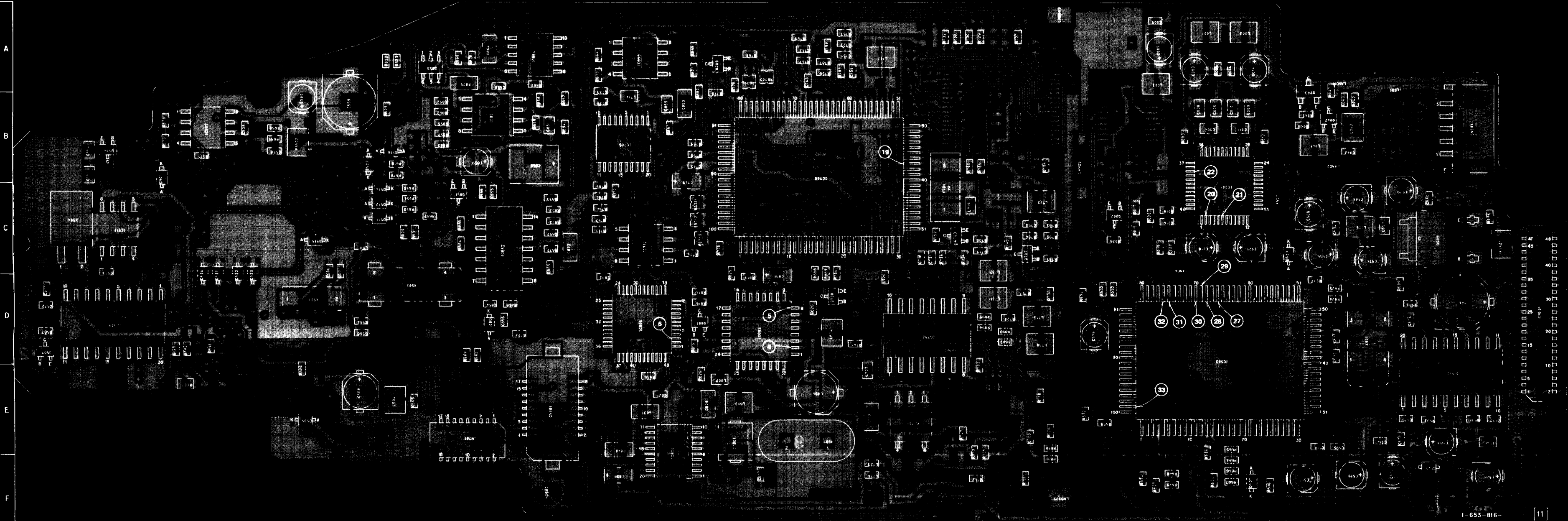
— Ref. No. CS-48 BOARD: 1,000 Series —

- For printed wiring boards.
-  : Pattern from the side which enables seeing.
(The inner two layer's patterns are not indicated)
-  : Through hole is omitted.

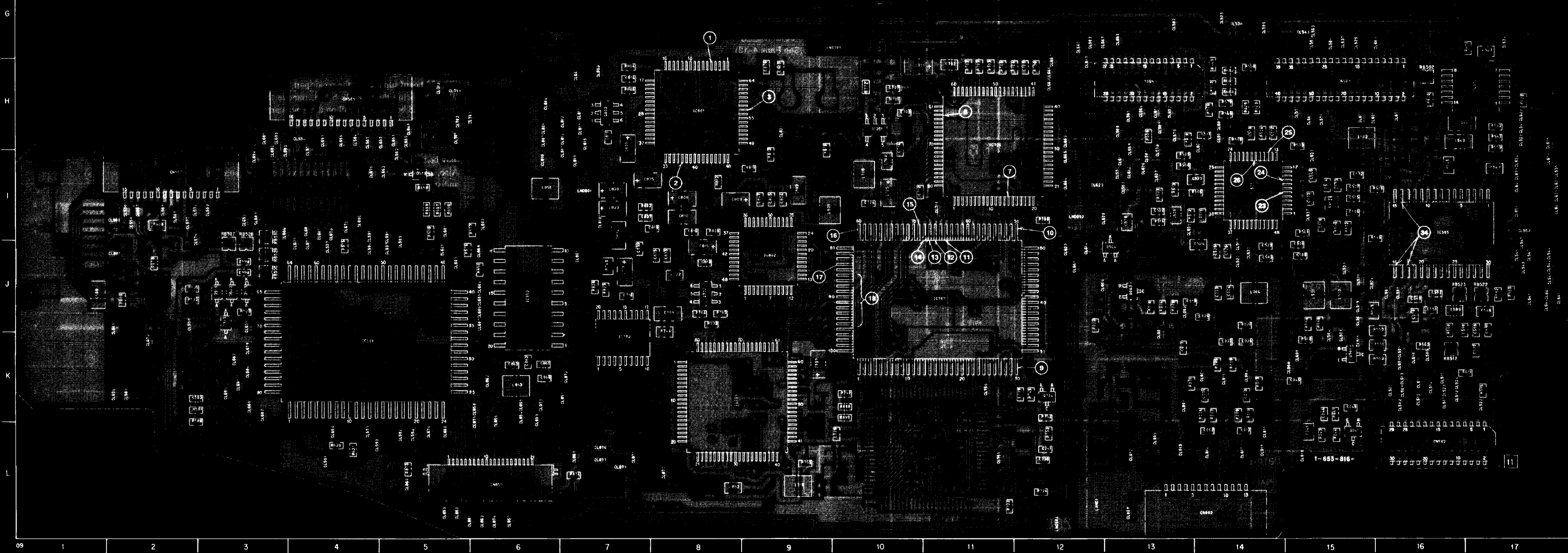
Caution:

Pattern face side: Parts on the pattern face side seen from the pattern face are indicated.
(Conductor Side)
Parts face side: Parts on the parts face side seen from the parts face are indicated.
(Component side)

CS-48 BOARD (COMPONENT SIDE)

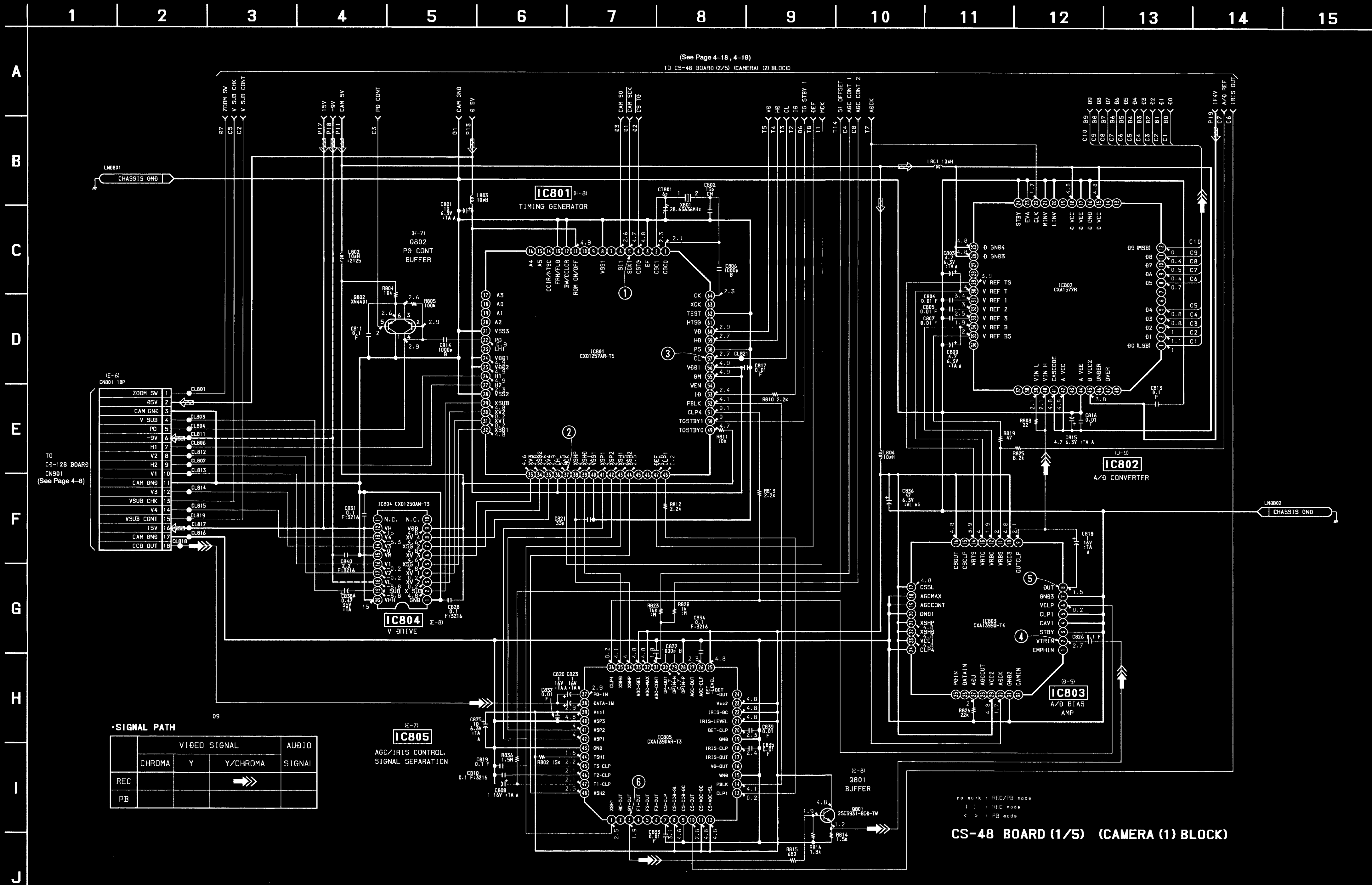


CS-48 BOARD (CONDUCTOR SIDE)

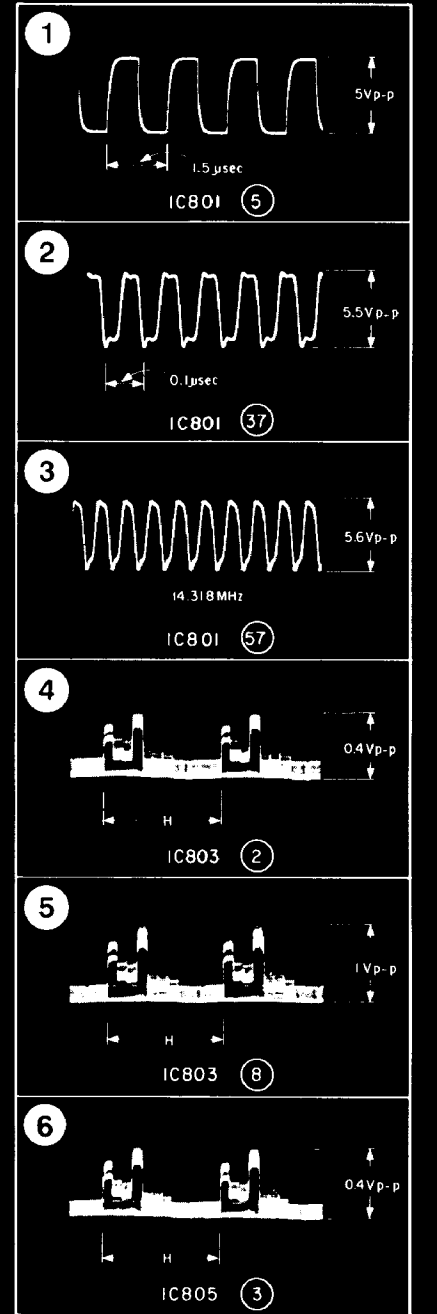


CS-48 (CAMERA (1)) SCHEMATIC DIAGRAM

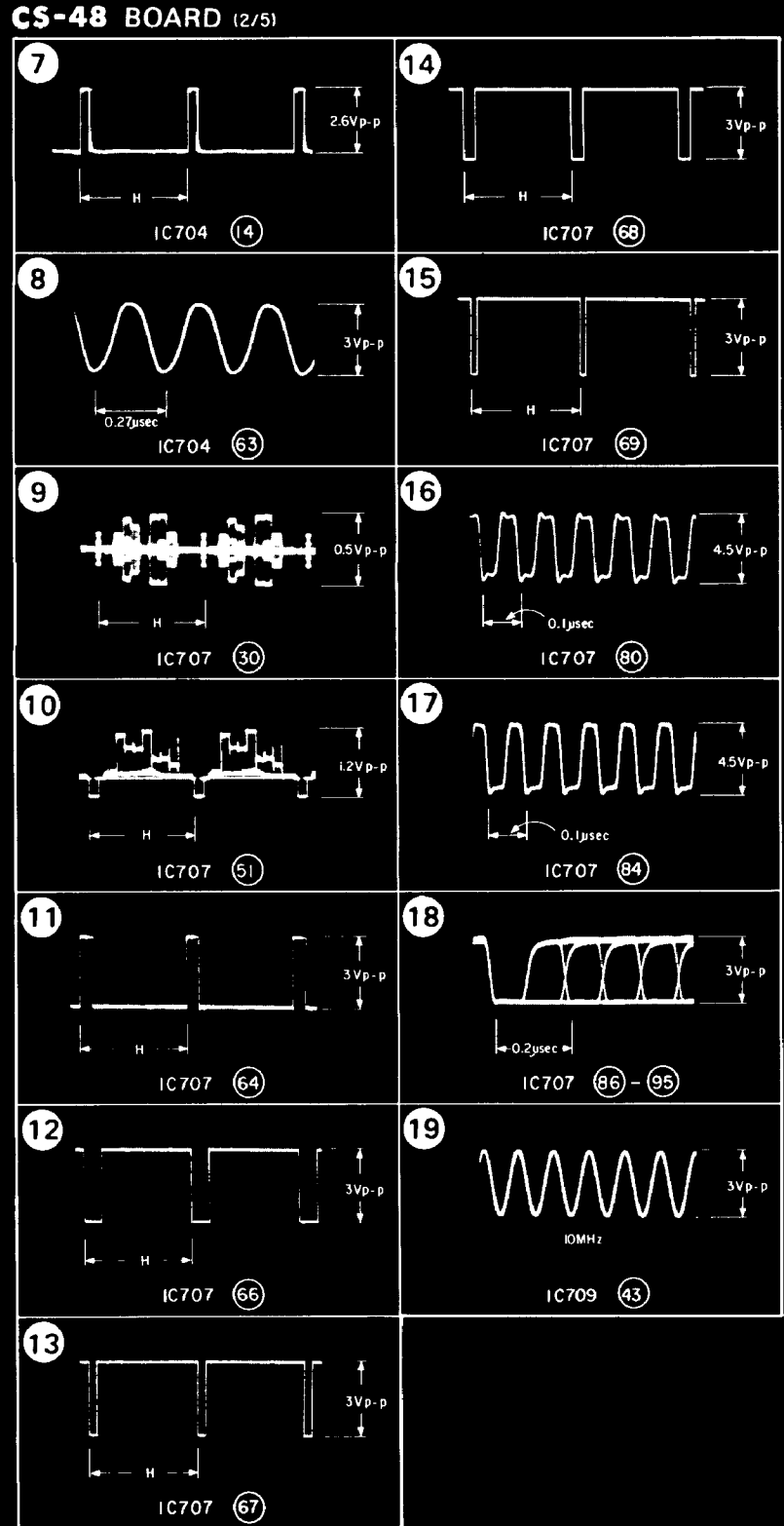
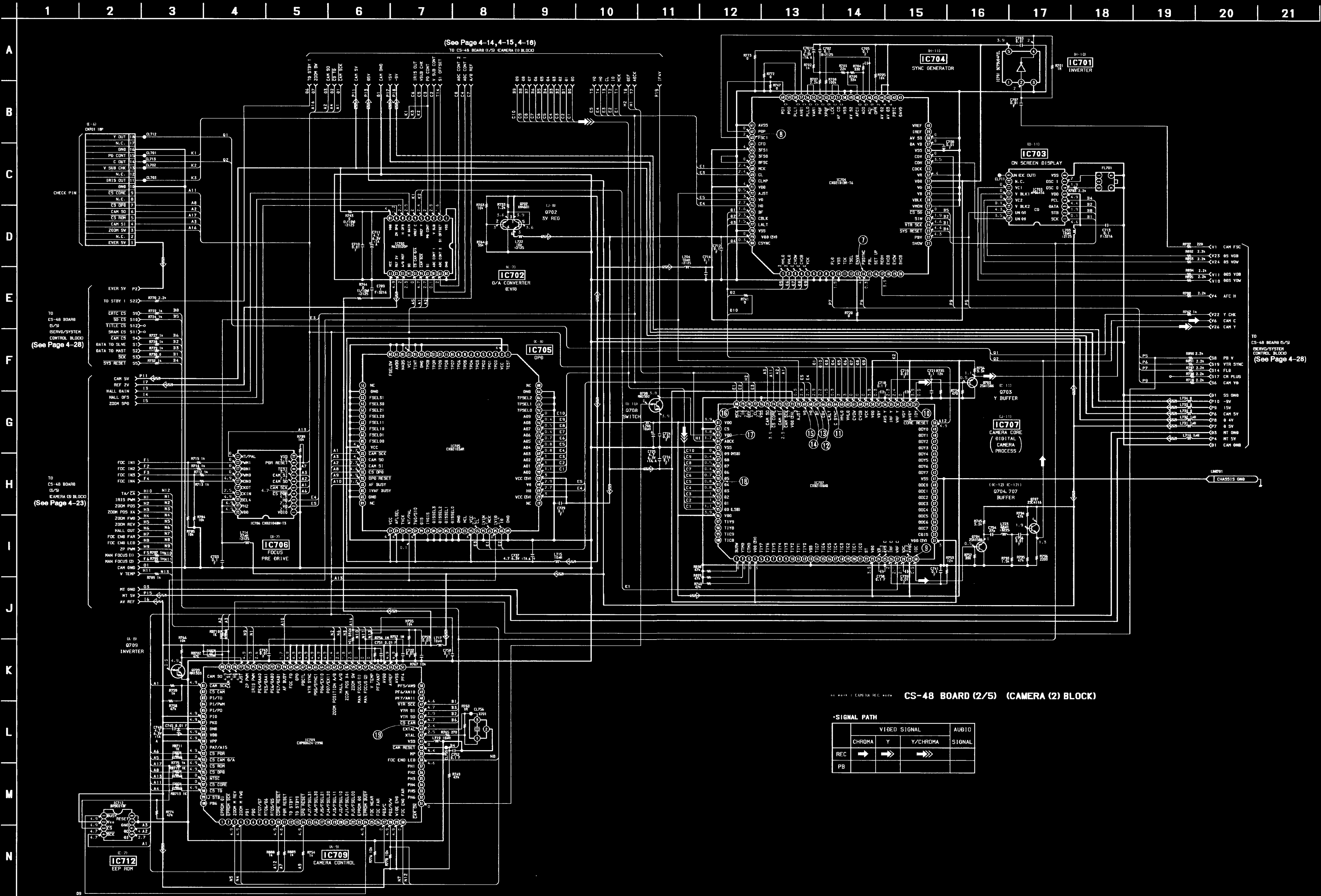
— Ref. No. CS-48 BOARD: 1,000 Series —



CS-48 BOARD (1/5)



CS-48 (CAMERA (2)) SCHEMATIC DIAGRAM
— Ref. No. CS-48 BOARD: 1,000 Series —



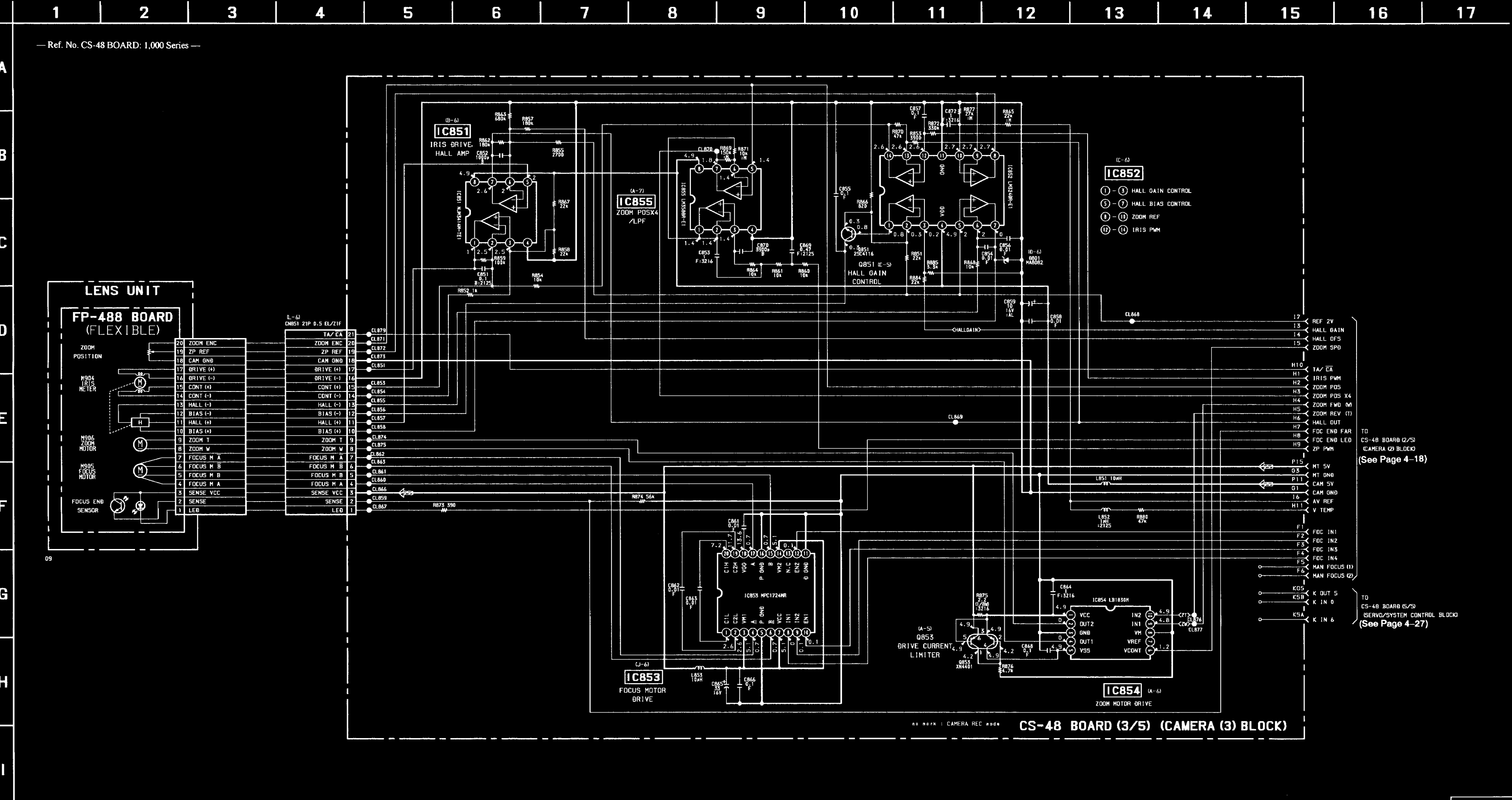
CS-48 BOARD (2/5) (CAMERA (2) BLOCK)

SIGNAL PATH

	VIDEO SIGNAL	AUDIO
CHROMA	Y	Y/CHROMA
REC	→	→
PB	→	→

CS-48 (CAMERA (3)) , FP-488 (INNER FOCUS LENS) SCHEMATIC DIAGRAM

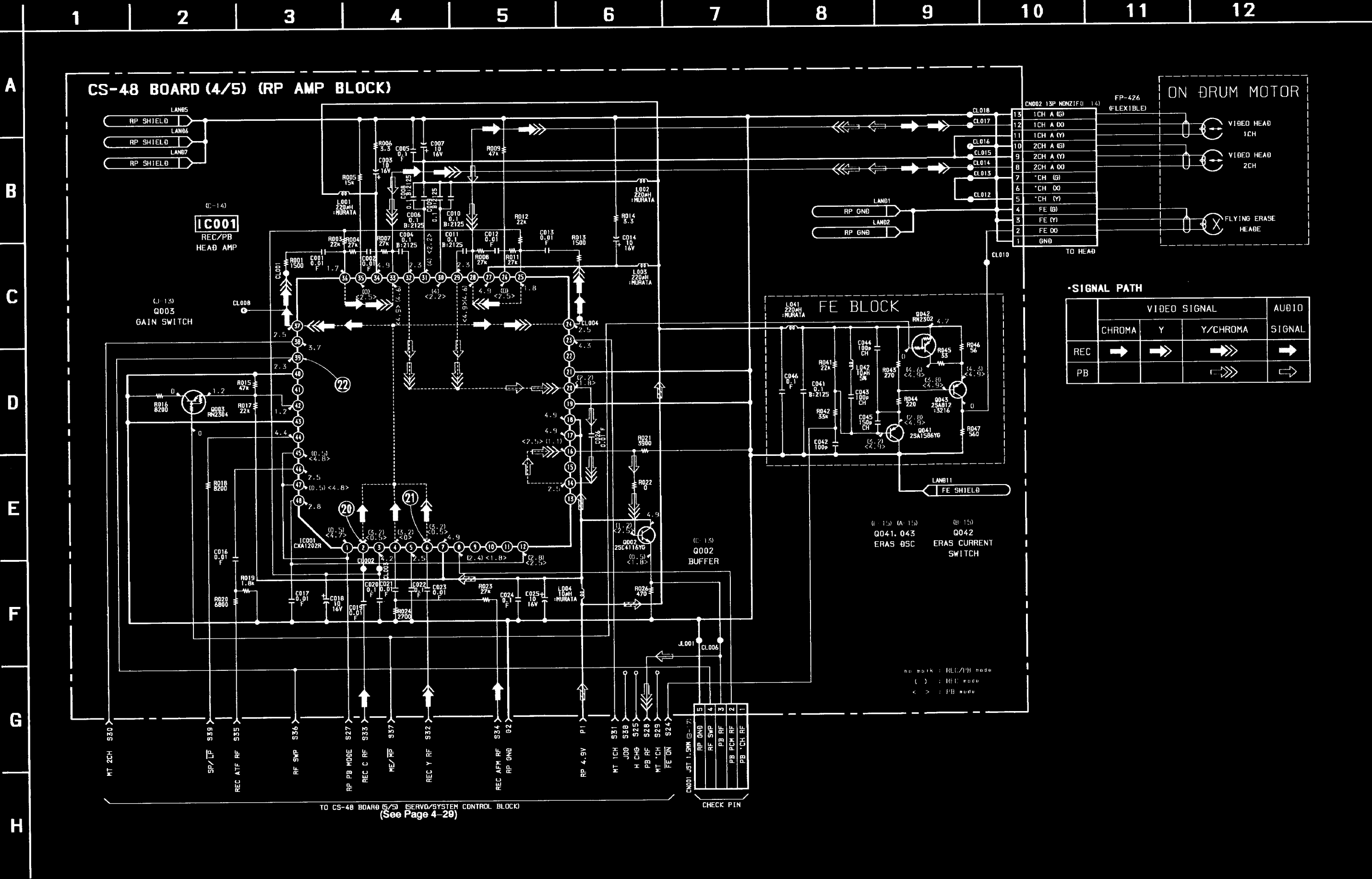
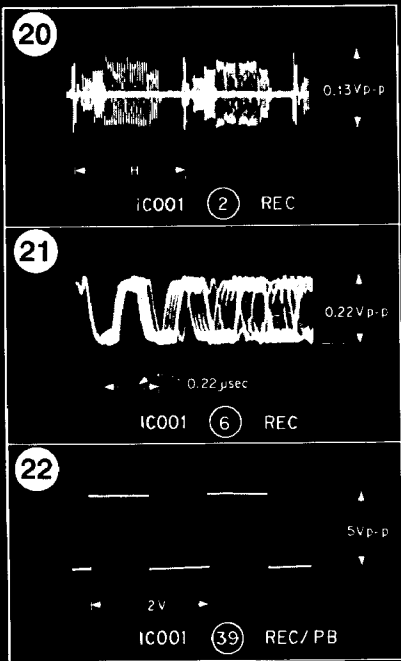
• Printed wiring board of FP-488 board (FLEXIBLE) is omitted.



CS-48 (REC/PB AMP) SCHEMATIC DIAGRAM

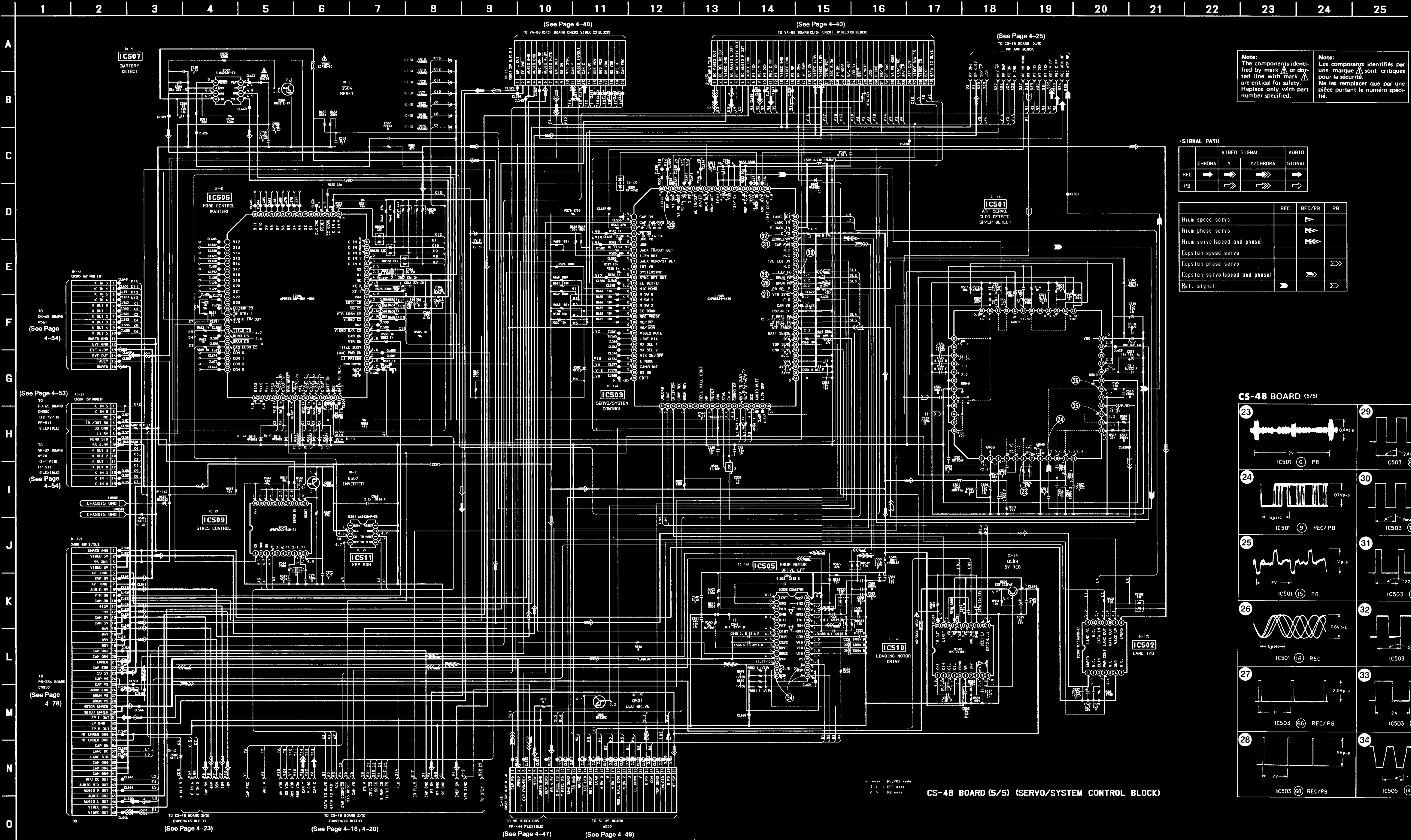
— Ref. No. CS-48 BOARD: 1,000 Series —

CS-48 BOARD (4/5)



CS-48 (SERVO/SYSTEM CONTROL) SCHEMATIC DIAGRAM

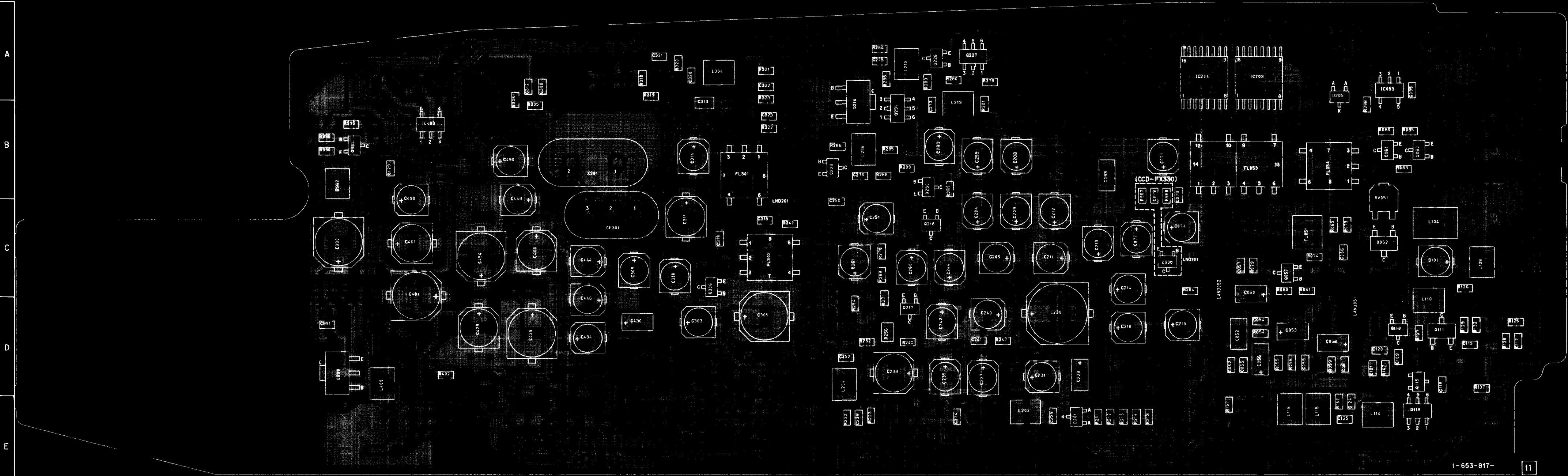
— Ref. No. CS-48 BOARD, 1,000 Series —



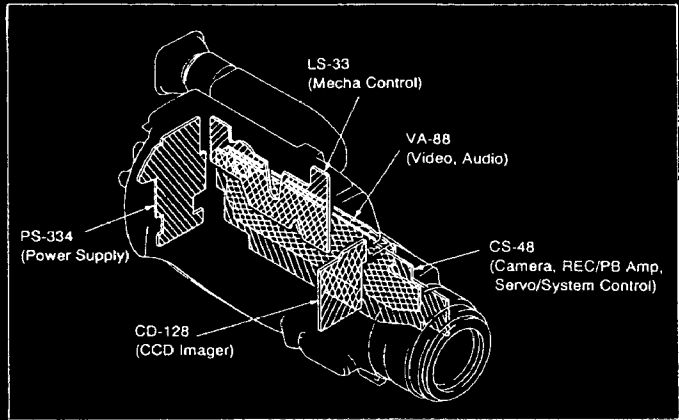
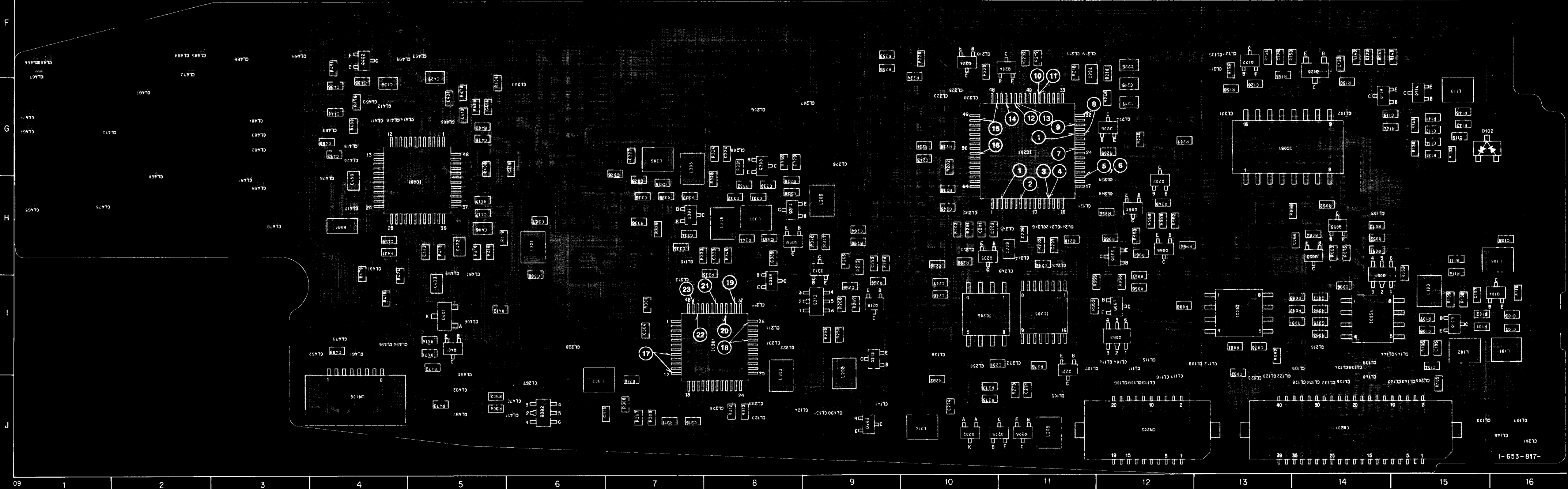
VA-88 (VIDEO, AUDIO) PRINTED WIRING BOARD

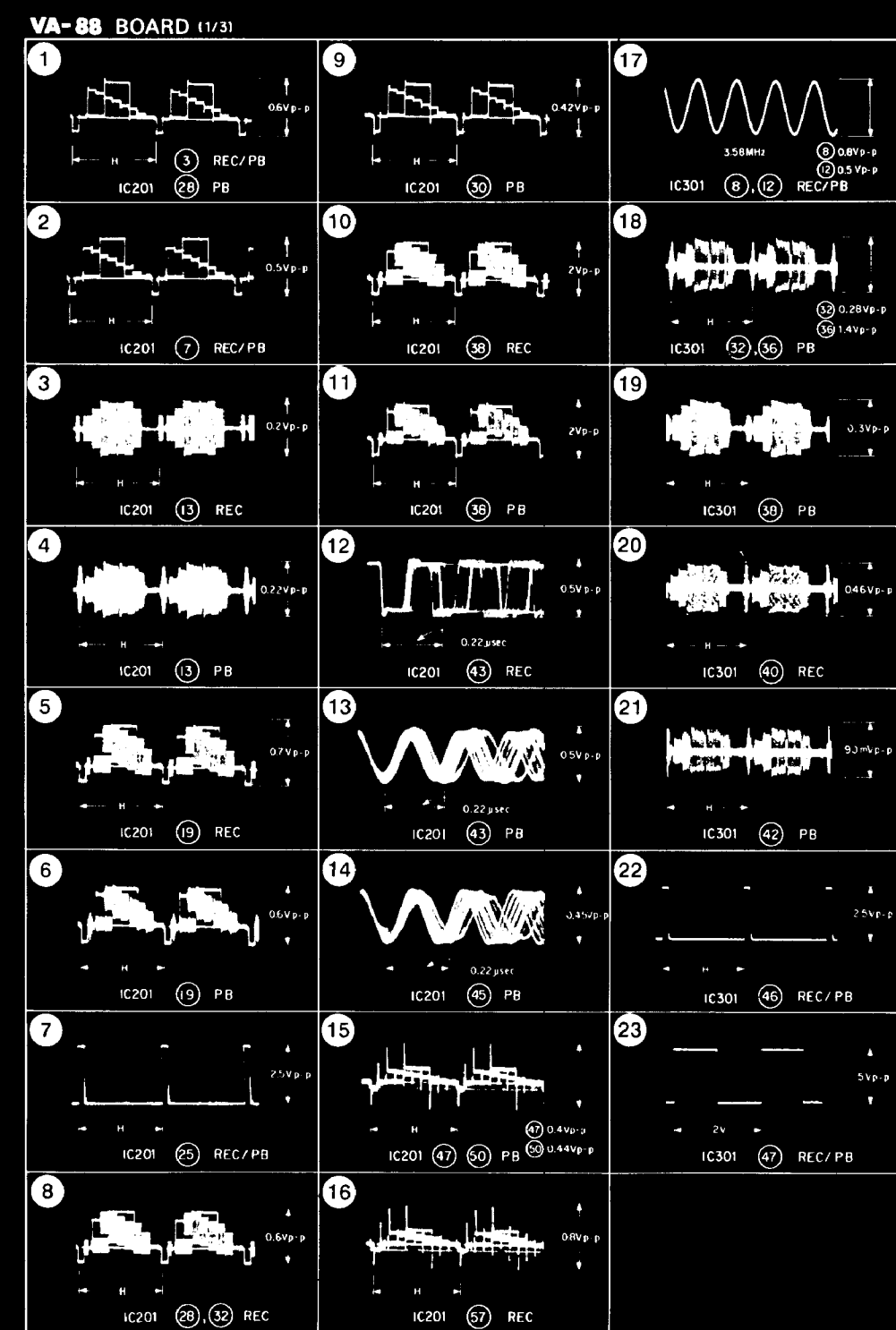
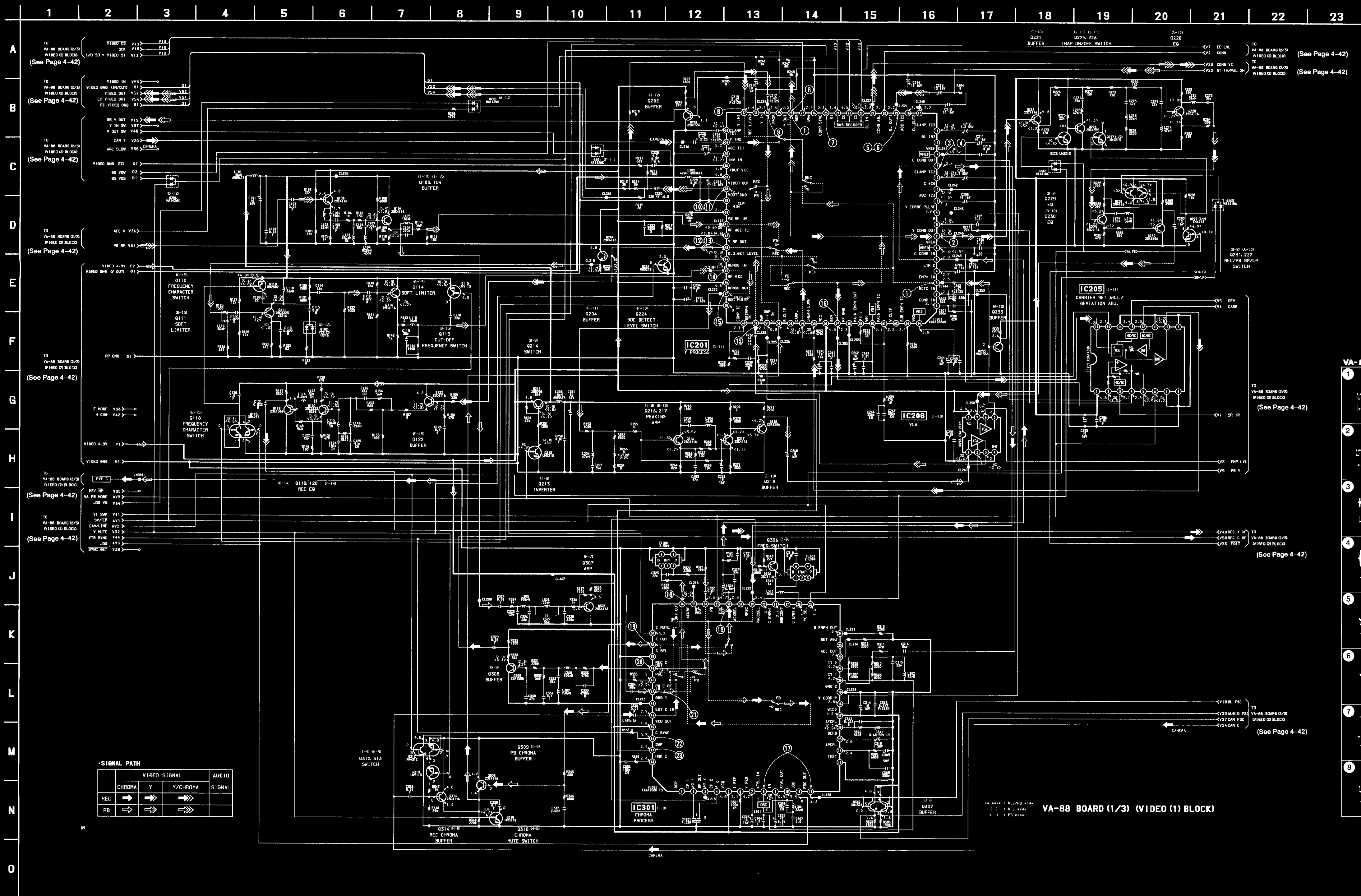
— Ref. No. VA-88 BOARD: 2,000 Series —

VA-88 BOARD (COMPONENT SIDE)



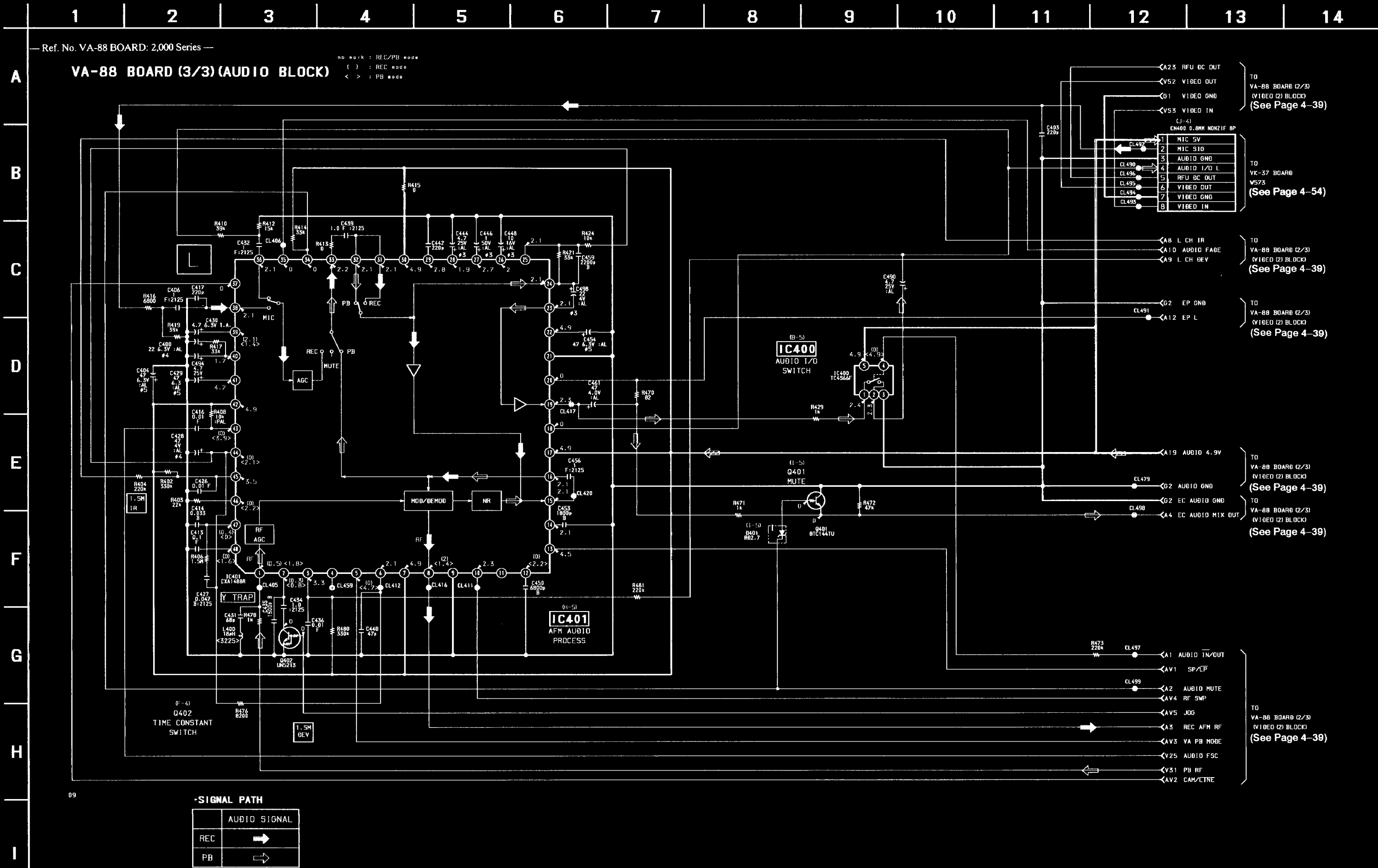
VA-88 BOARD (CONDUCTOR SIDE)







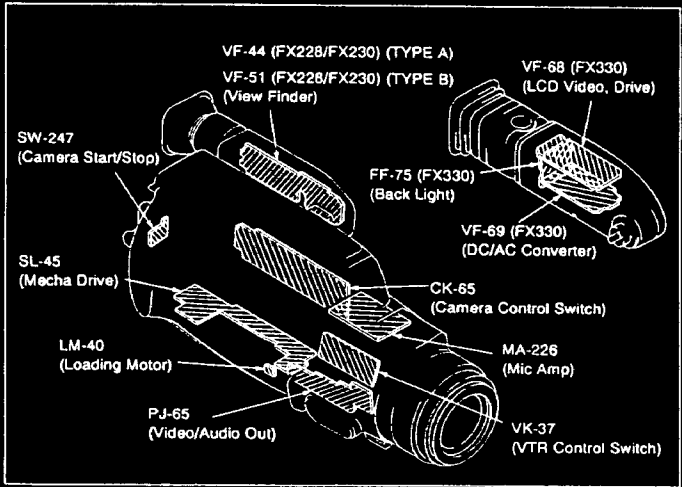
VA-88 (AUDIO) SCHEMATIC DIAGRAM



4-45

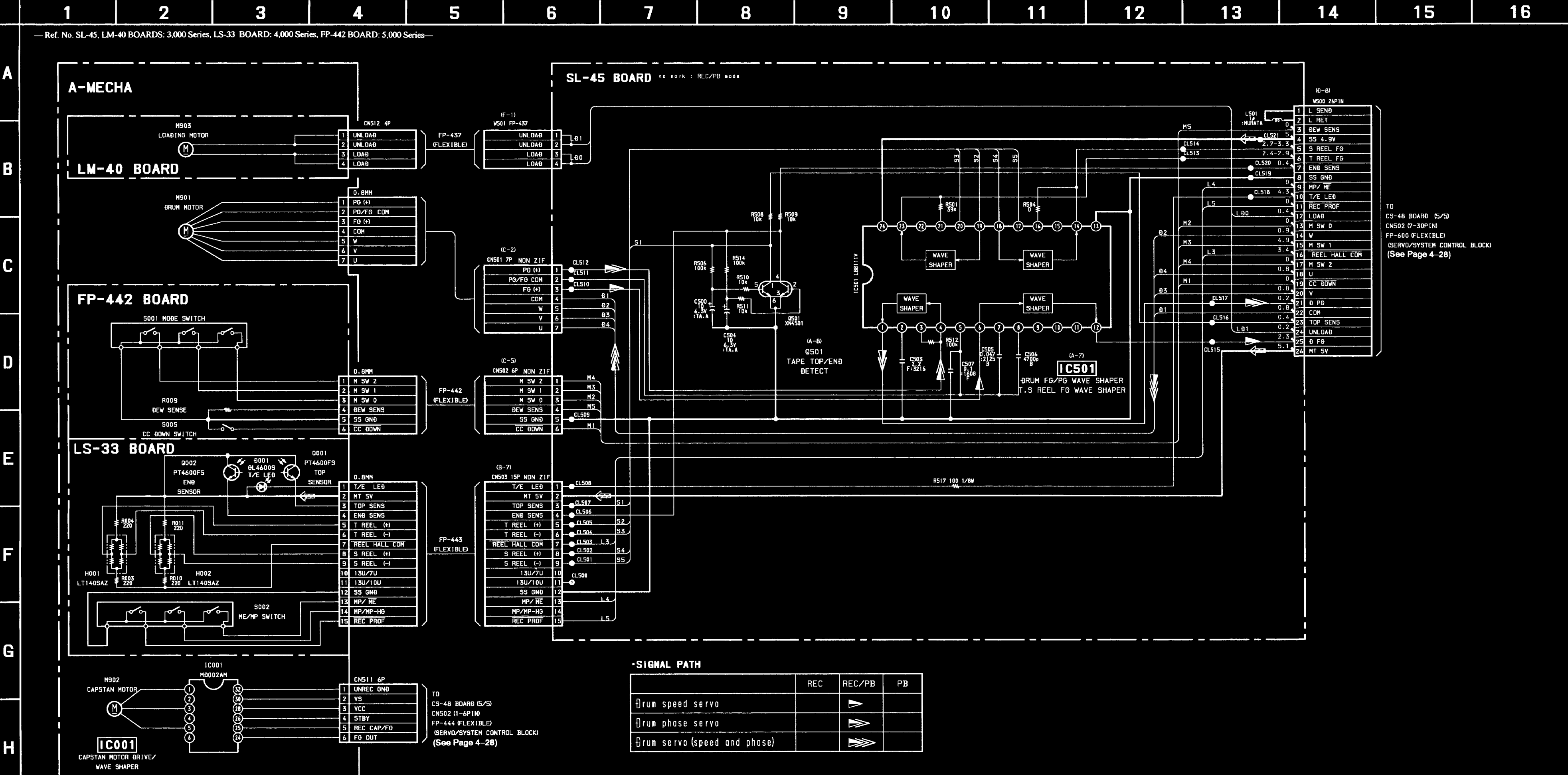
4-46





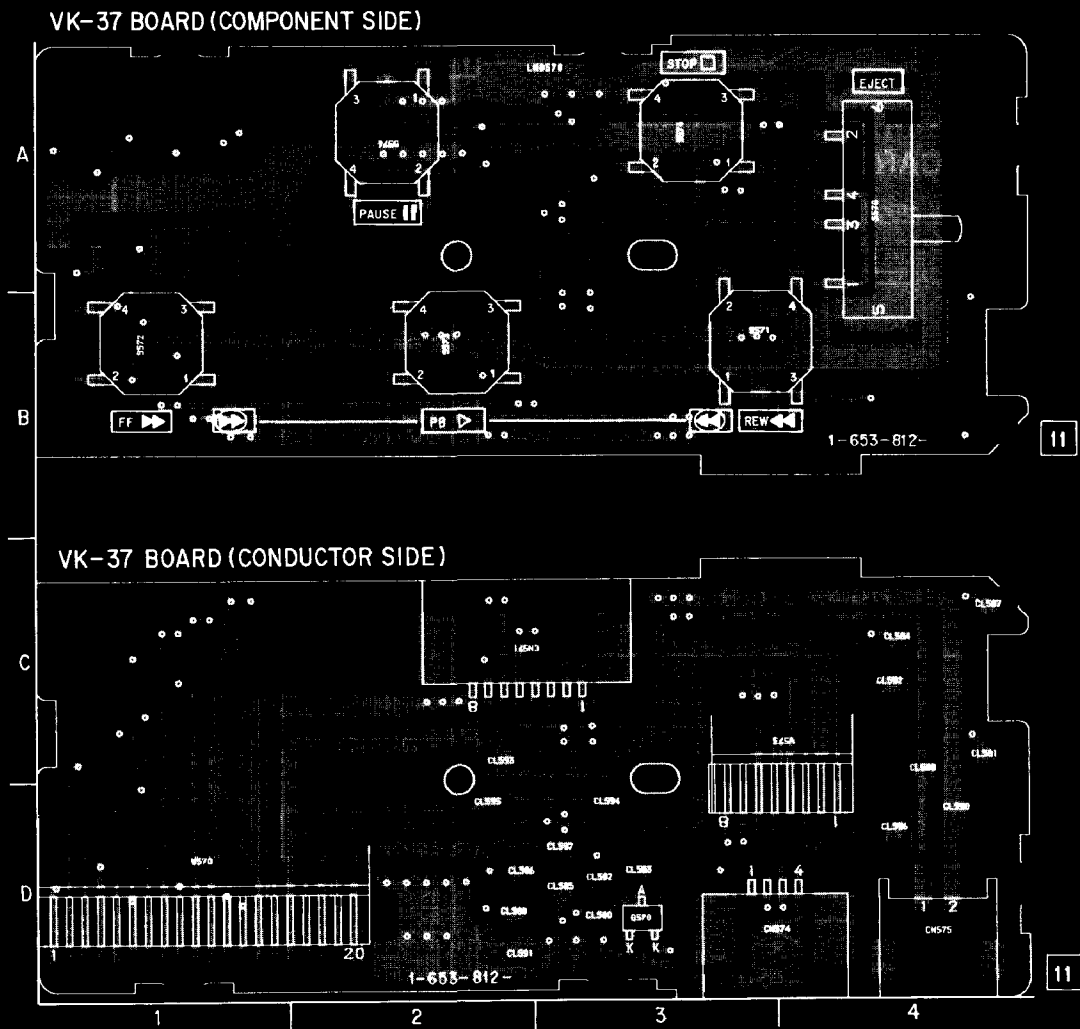
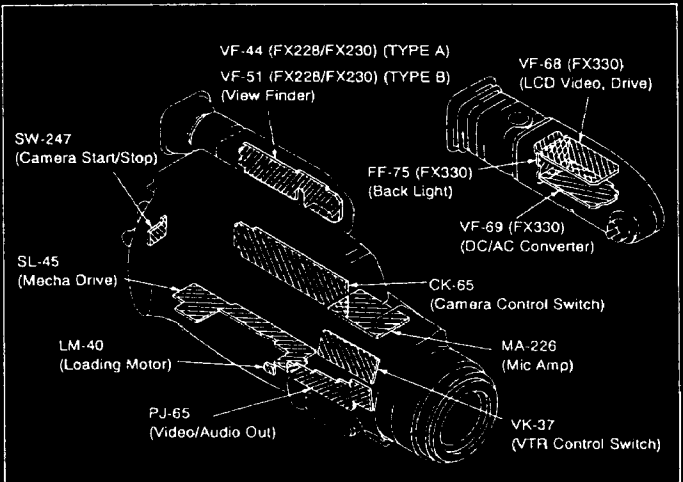
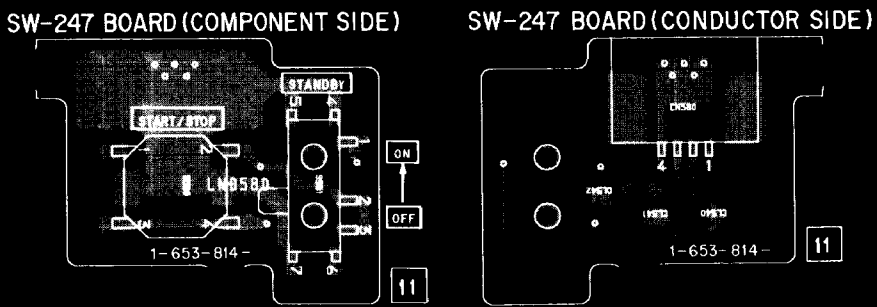
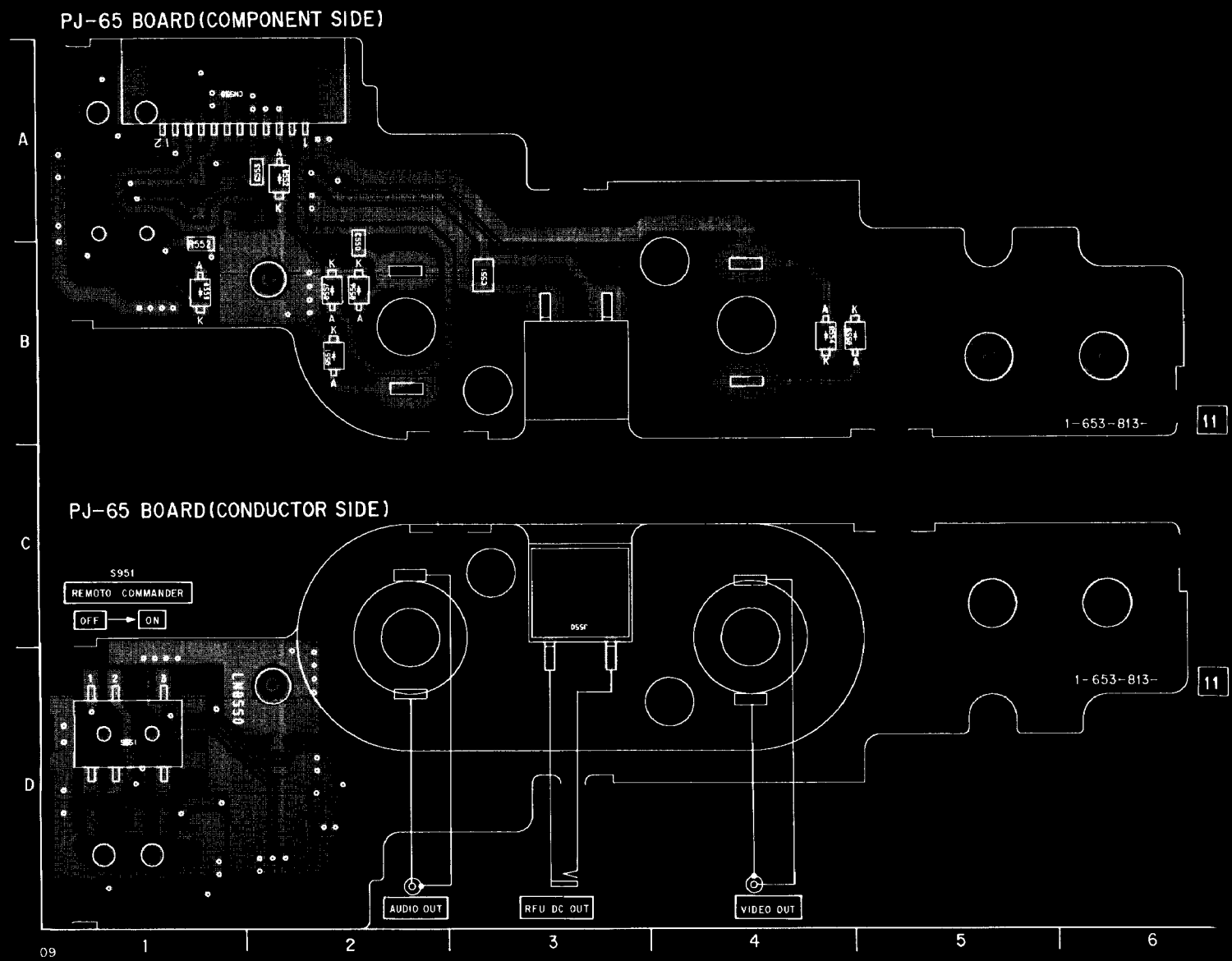
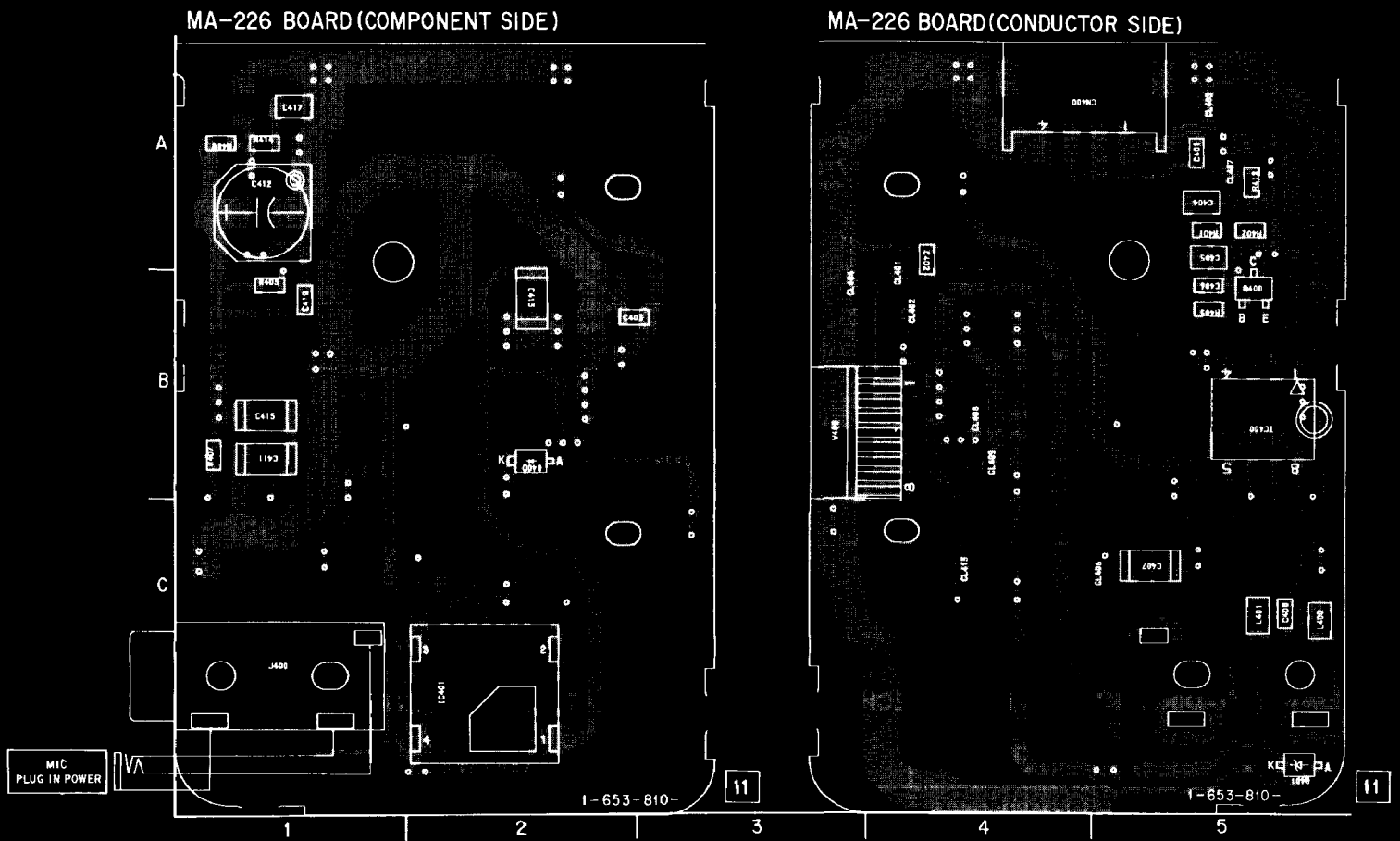
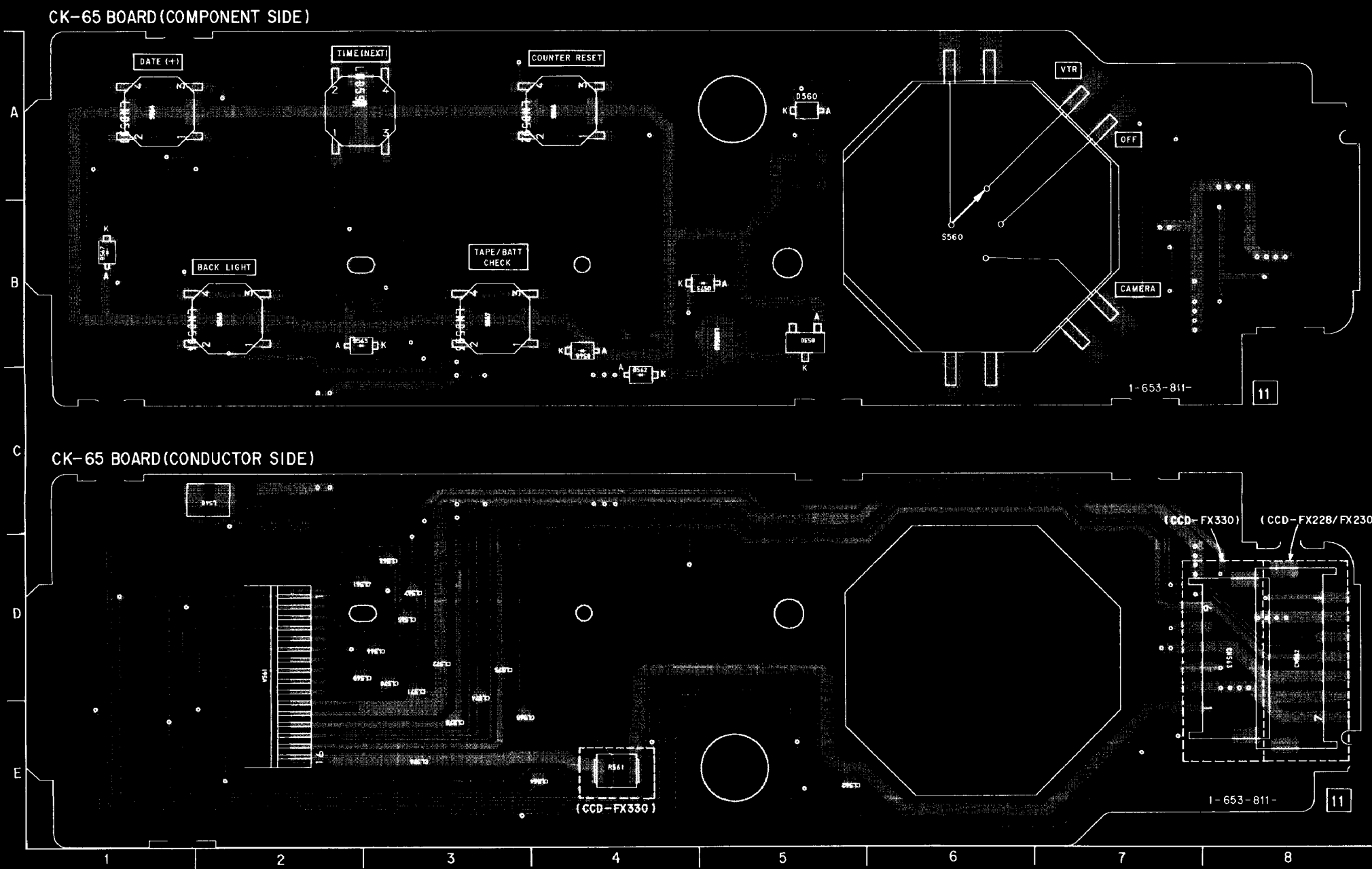
SL-45 (MECHA DRIVE) , LM-40 (LOADING MOTOR) , LS-33 (MECHA CONTROL) , FP-442 SCHEMATIC DIAGRAM

• Printed wiring boards of FP-442 board (FLEXIBLE), LM-40 board and LS-33 board are omitted. • For schematic diagrams. • Chip resistor are 1/10W unless otherwise noted. (LS-33 board)

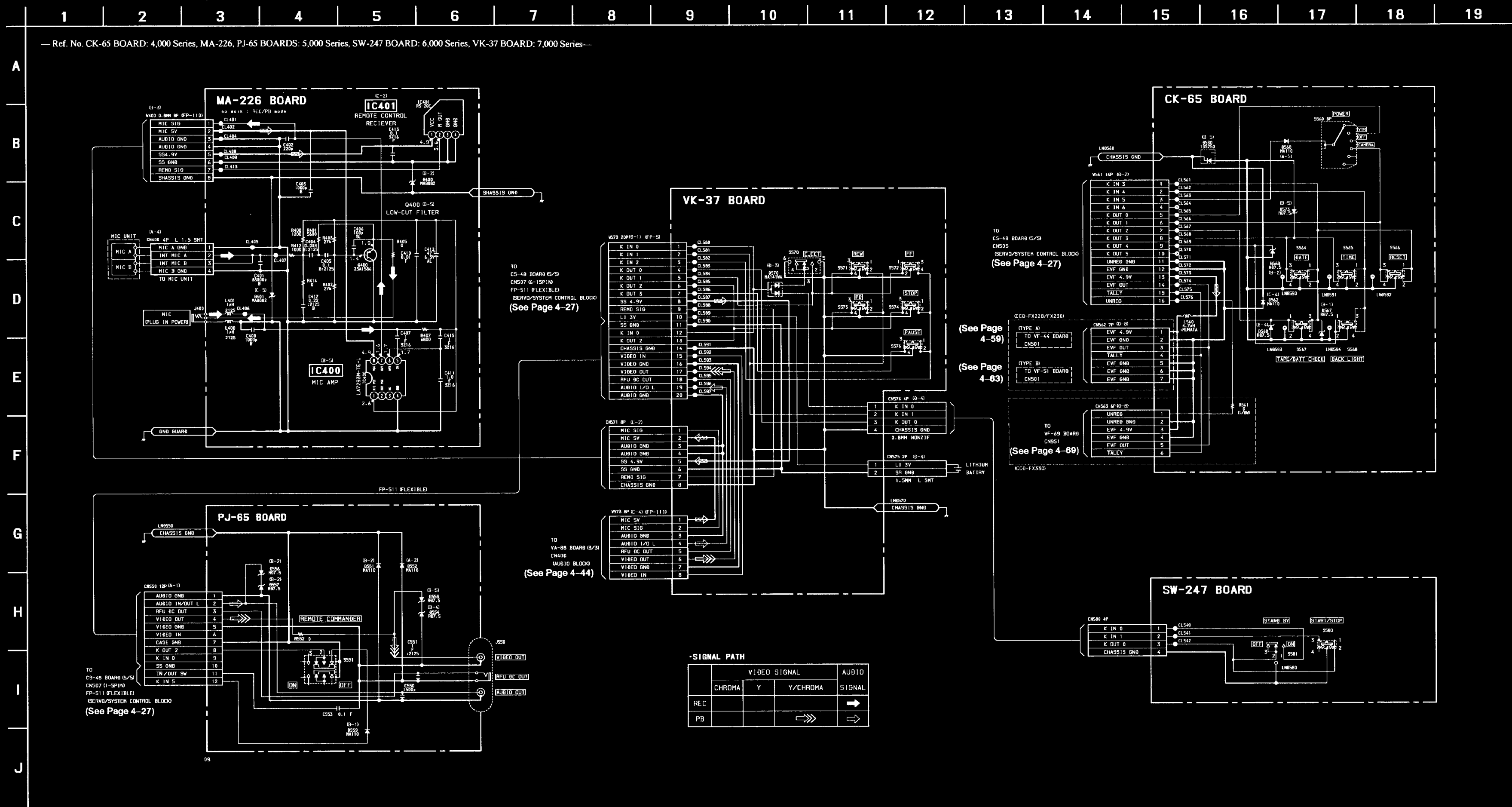


CK-65 (CAMERA CONTROL SWITCH) , MA-226 (MIC AMP) , PJ-65 (VIDEO/AUDIO OUT) , SW-247 (CAMERA START/STOP) , VK-37 (VTR CONTROL SWITCH) PRINTED WIRING BOARD

— Ref. No. CK-65 BOARD: 4,000 Series, MA-226, PJ-65 BOARDS: 5,000 Series, SW-247 BOARD: 6,000 Series, VK-37 BOARD: 7,000 Series —

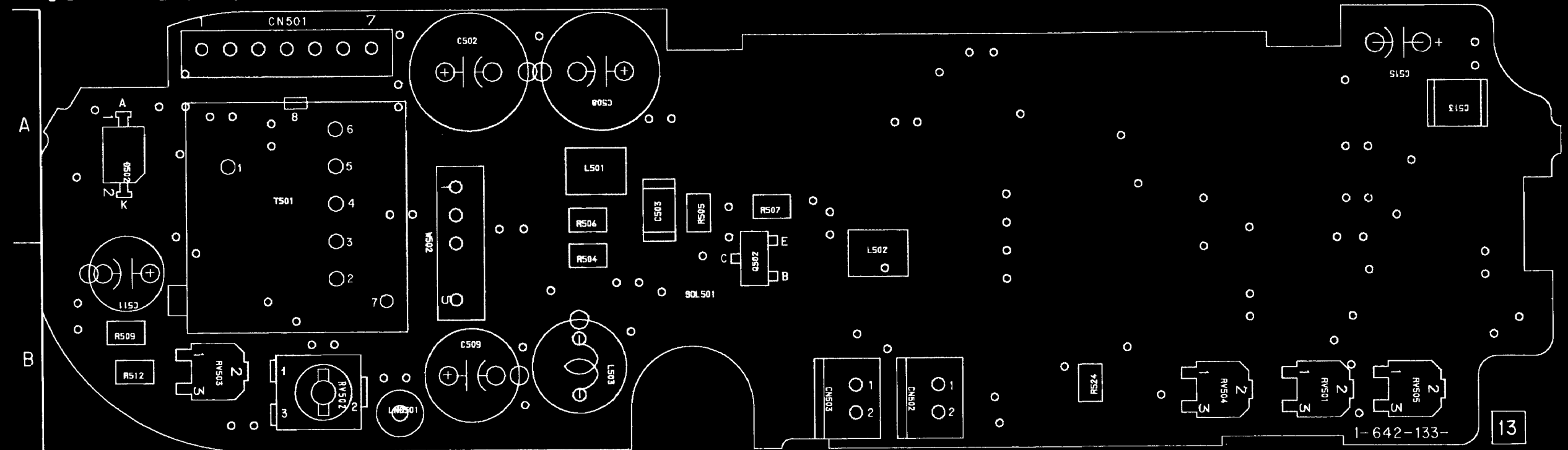


CK-65 (CAMERA CONTROL SWITCH) , MA-226 (MIC AMP) , PJ-65 (VIDEO/AUDIO OUT) , SW-247 (CAMERA START/STOP) , VK-37 (VTR CONTROL SWITCH) SCHEMATIC DIAGRAM

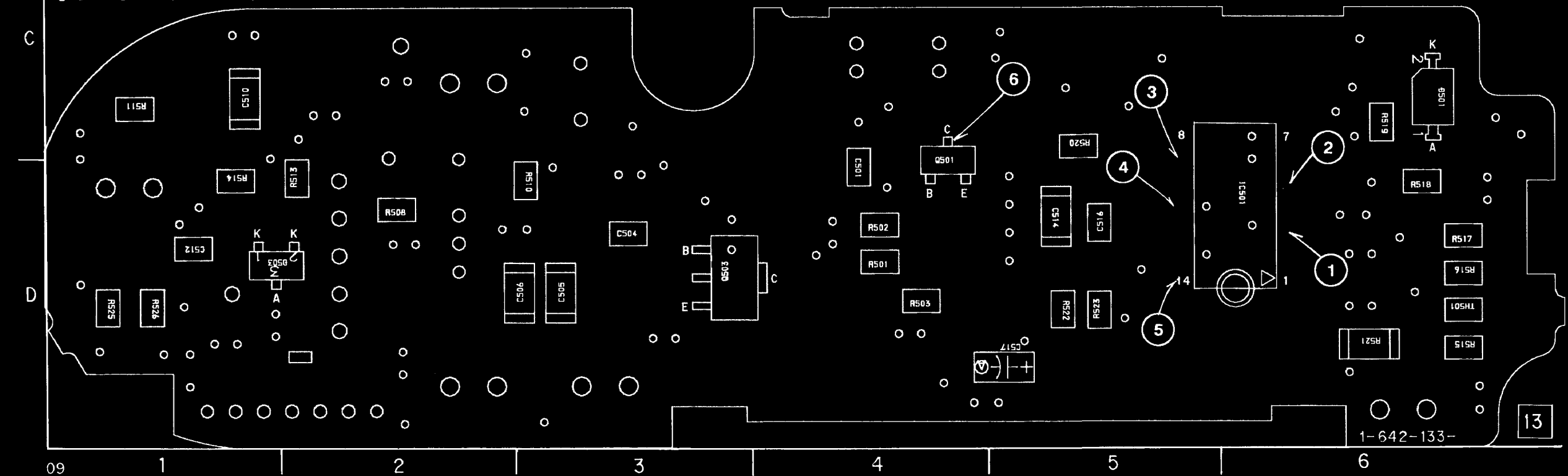


— Ref. No. VF-44 BOARD: 8,000 Series —

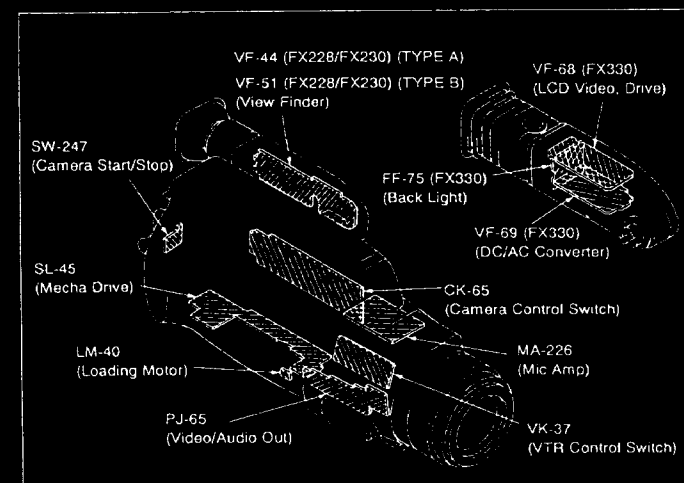
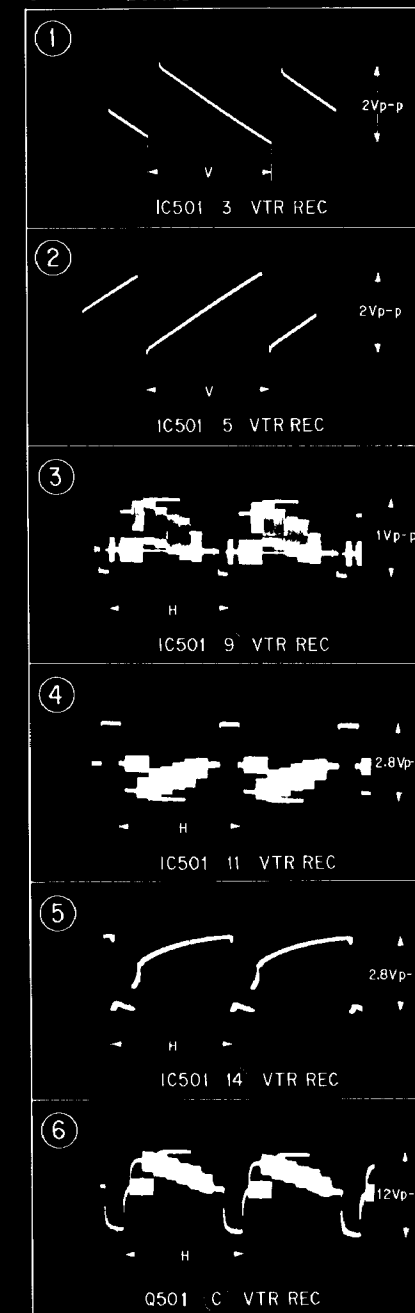
VF-44 BOARD (COMPONENT SIDE)



VF-44 BOARD (CONDUCTOR SIDE)



VF-44 BOARD



VF-44 (VIEW FINDER (TYPE A)) SCHEMATIC DIAGRAM (CCD-FX228/FX230)

• For schematic diagrams • Chip resistor are 1/10W unless otherwise noted.

— Ref. No. VF-44 BOARD: 8,000 Series —

VF-44 BOARD (TYPE A)

no mark : REC/PB mode

Q502 (B-4)
HOLD DOWN

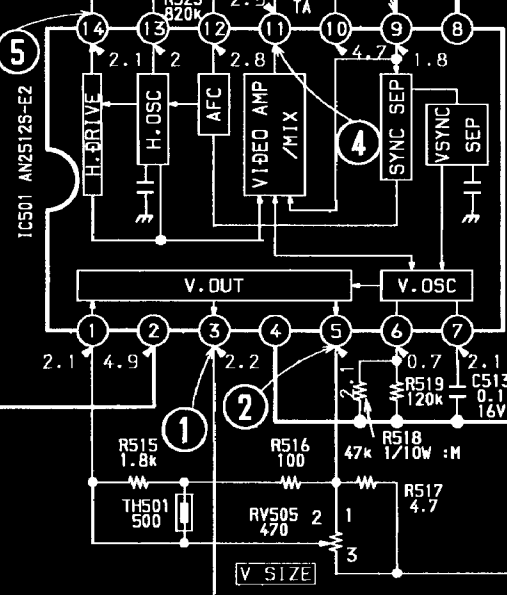
Q501 (B-4)
VIDEO AMP
Q503 (B-3)
H. OUT

(A-2)
CN501 7P 1.5 JST

EVF 5V	1
EVF GND	2
EVF OUT	3
TALLY	4
EVF GND	5
EVF GND	6
EVF GND	7

TO
CK-65 BOARD
CN562
(See Page 4-54)

(B-6)
IC501
H. V. OSC



Note:
The components identified by mark or dotted line with mark are critical for safety. Replace only with part number specified.

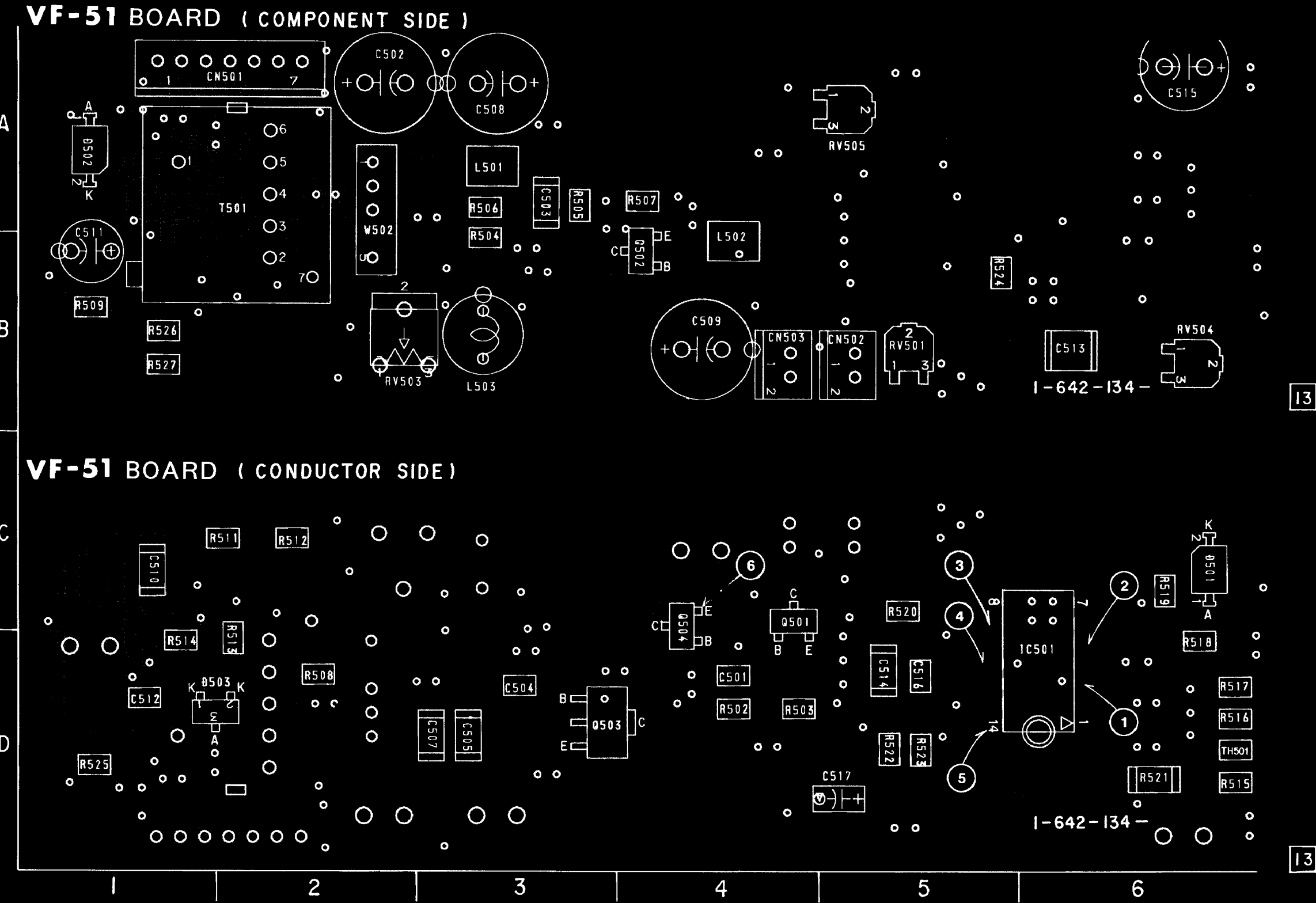
Note:
Les composants identifiés par une marque sont critiques pour la sécurité. Ne les remplacer que par une pièce portant le numéro spécifié.

- SIGNAL PATH

	VIDEO SIGNAL			AUDIO
	CHROMA	Y	Y/CHROMA	
REC				
PB				

VF-51 (VIEW FINDER (TYPE B)) PRINTED WIRING BOARD (CCD-FX228/FX230)

— Ref. No. VF-51 BOARD: 9,000 Series —



VF-51 (VIEW FINDER (TYPE B)) SCHEMATIC DIAGRAM (CCD-FX228/FX230)

• For schematic diagrams • Chip resistor are 1/10W unless otherwise noted.

— Ref. No. VF-51 BOARD: 9,000 Series —

A

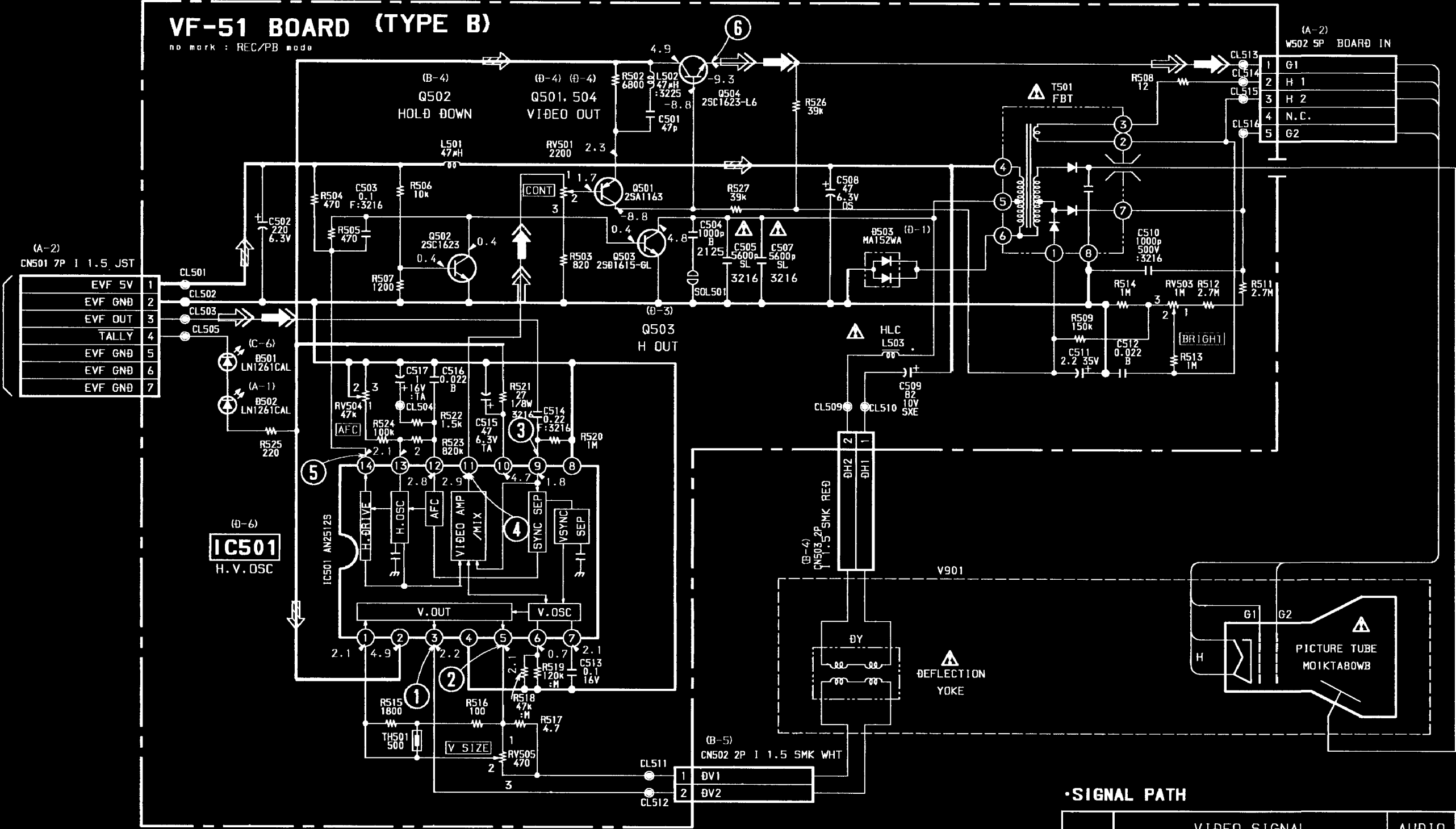
B

C

D

E

F



TO
CK-65 BOARD
CNS62
(See Page 4-54)

(A-2)	CNS01 7P 1 1.5 JST
1	EVF 5V
2	EVF GND
3	EVF OUT
4	TALLY
5	EVF GND
6	EVF GND
7	EVF GND

(B-6)
IC501
H. V. OSC

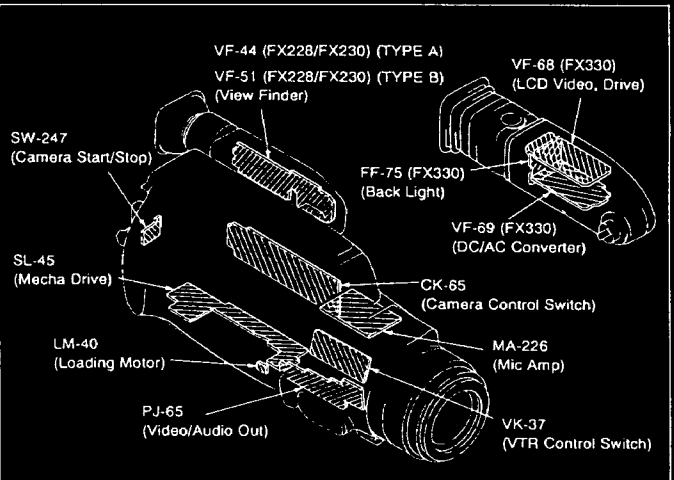
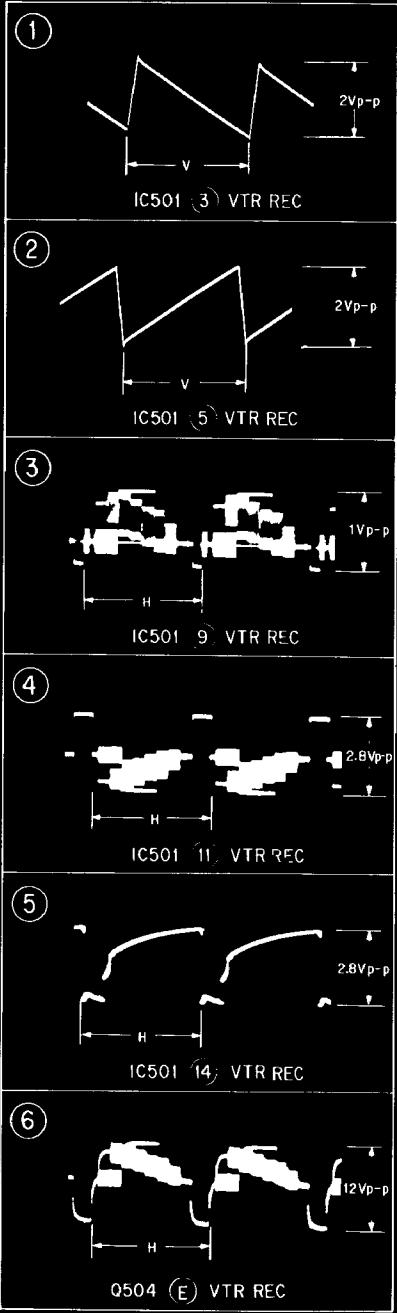
Note:
The components identified by mark or dotted line with mark are critical for safety. Replace only with part number specified.

Note:
Les composants identifiés par une marque sont critiques pour la sécurité. Ne les remplacer que par une pièce portant le numéro spécifié.

• SIGNAL PATH

	VIDEO SIGNAL			AUDIO SIGNAL
	CHROMA	Y	Y/CHROMA	
REC				
PB				

VF-51 BOARD

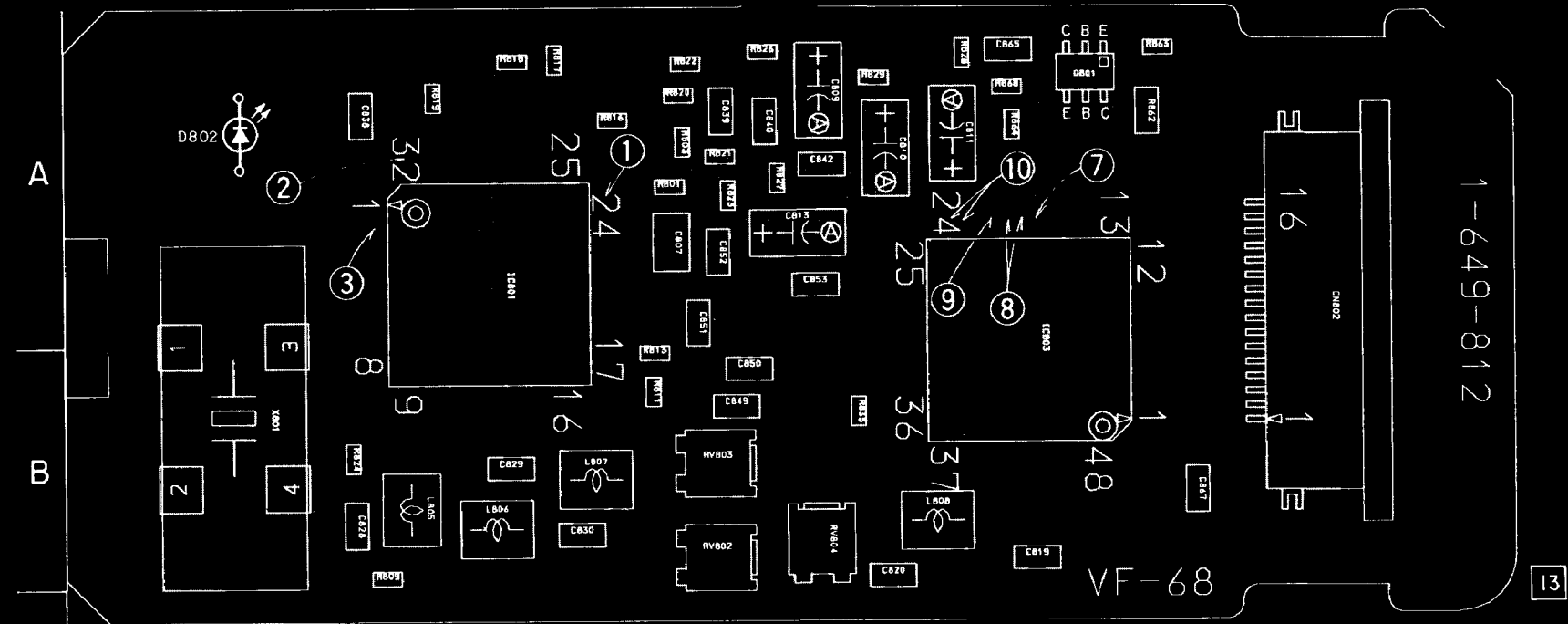


CCD-FX228/FX230/FX330

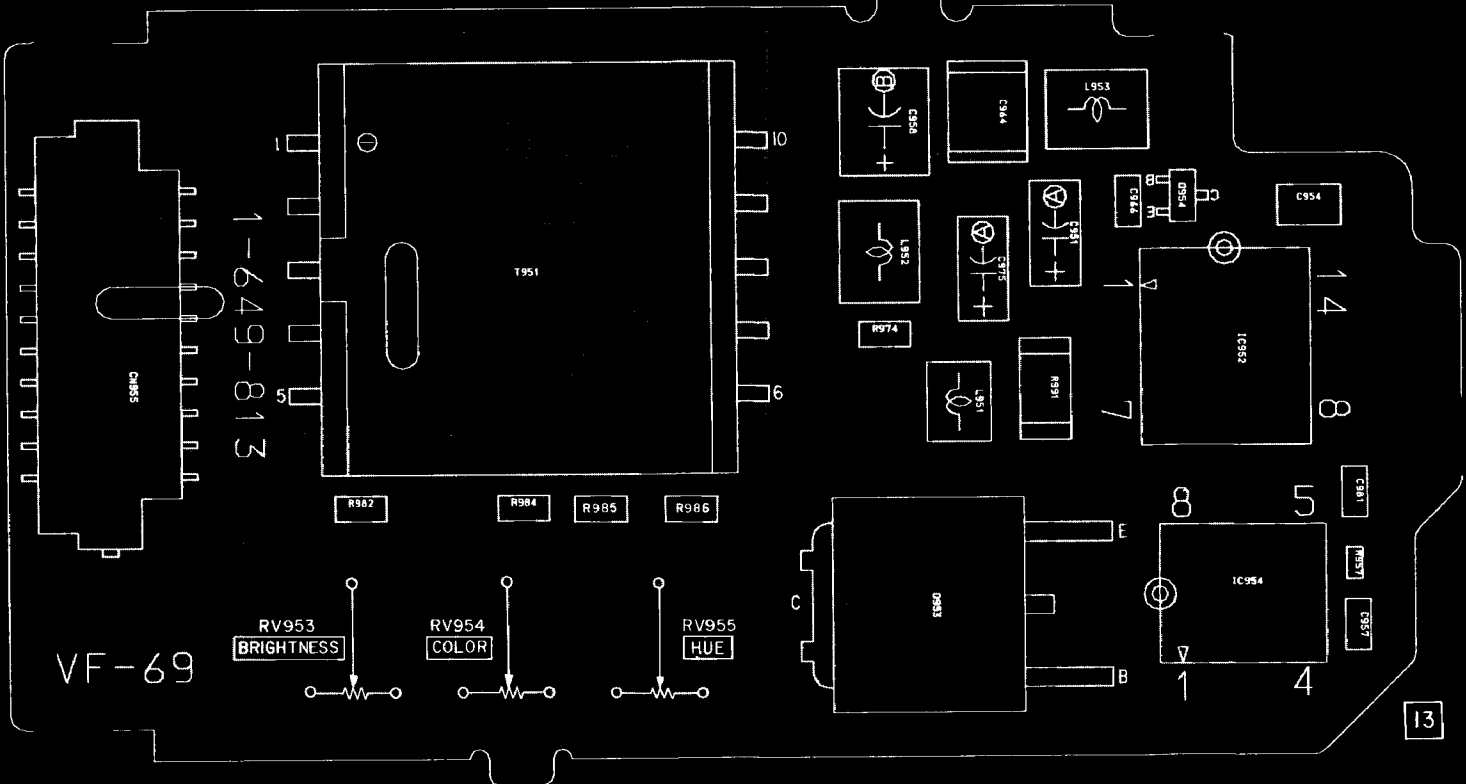
VF-68 (LCD VIDEO, DRIVE) , VF-69 (DC/AC CONVERTER) , FF-75 (BACK LIGHT) PRINTED WIRING BOARD (CCD-FX330)

— Ref. No. FF-75 BOARD: 7,000 Series, VF-68 BOARD: 8,000 Series, VF-69 BOARD: 9,000 Series—

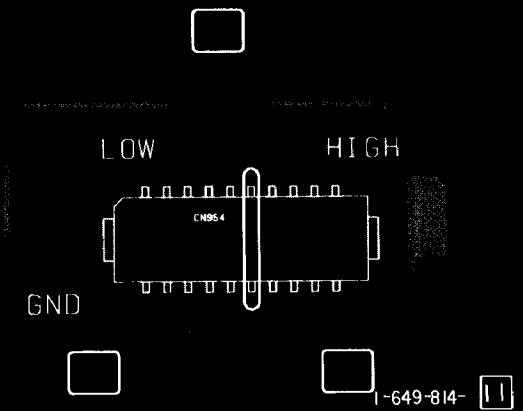
VF-68 BOARD (COMPONENT SIDE)



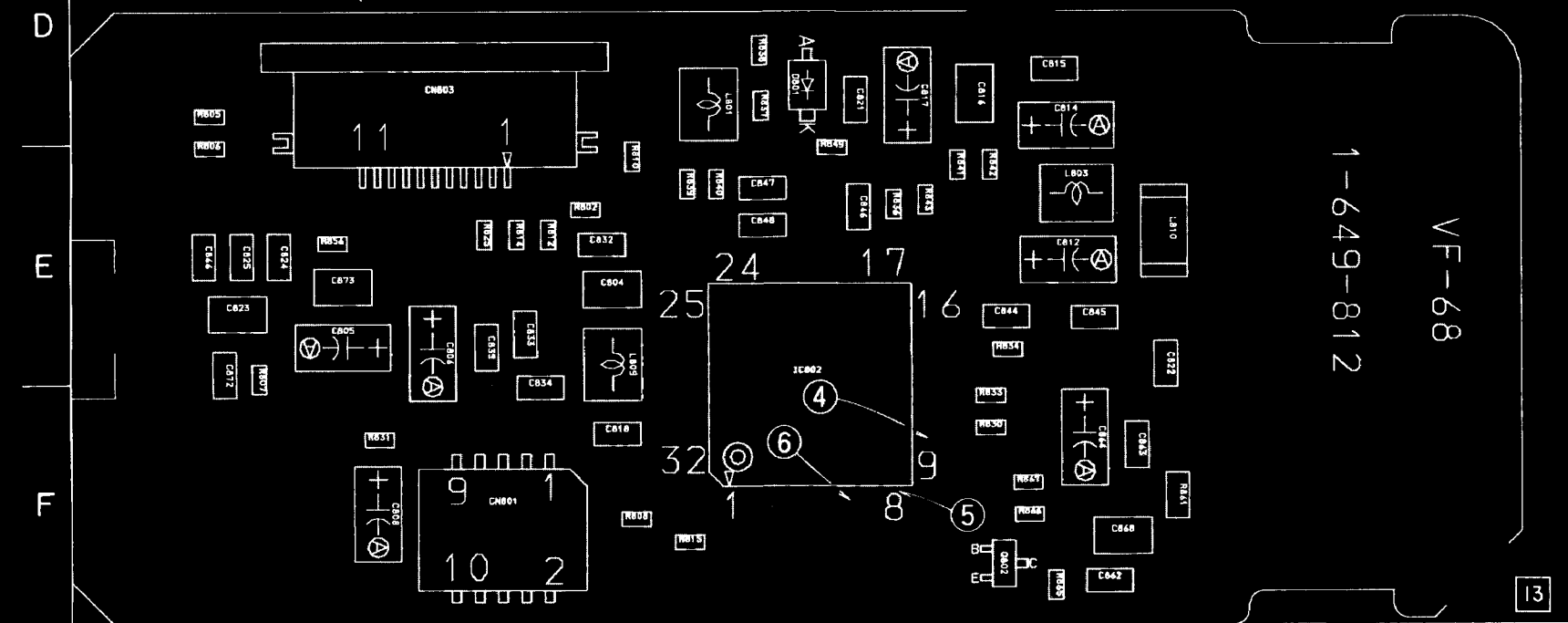
VF-69 BOARD (COMPONENT SIDE)



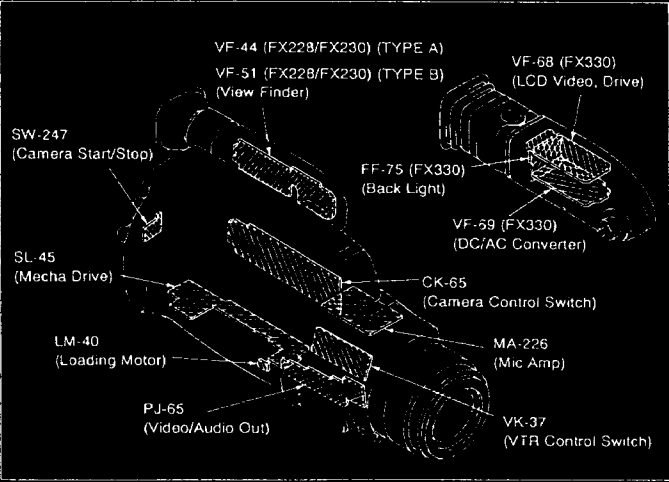
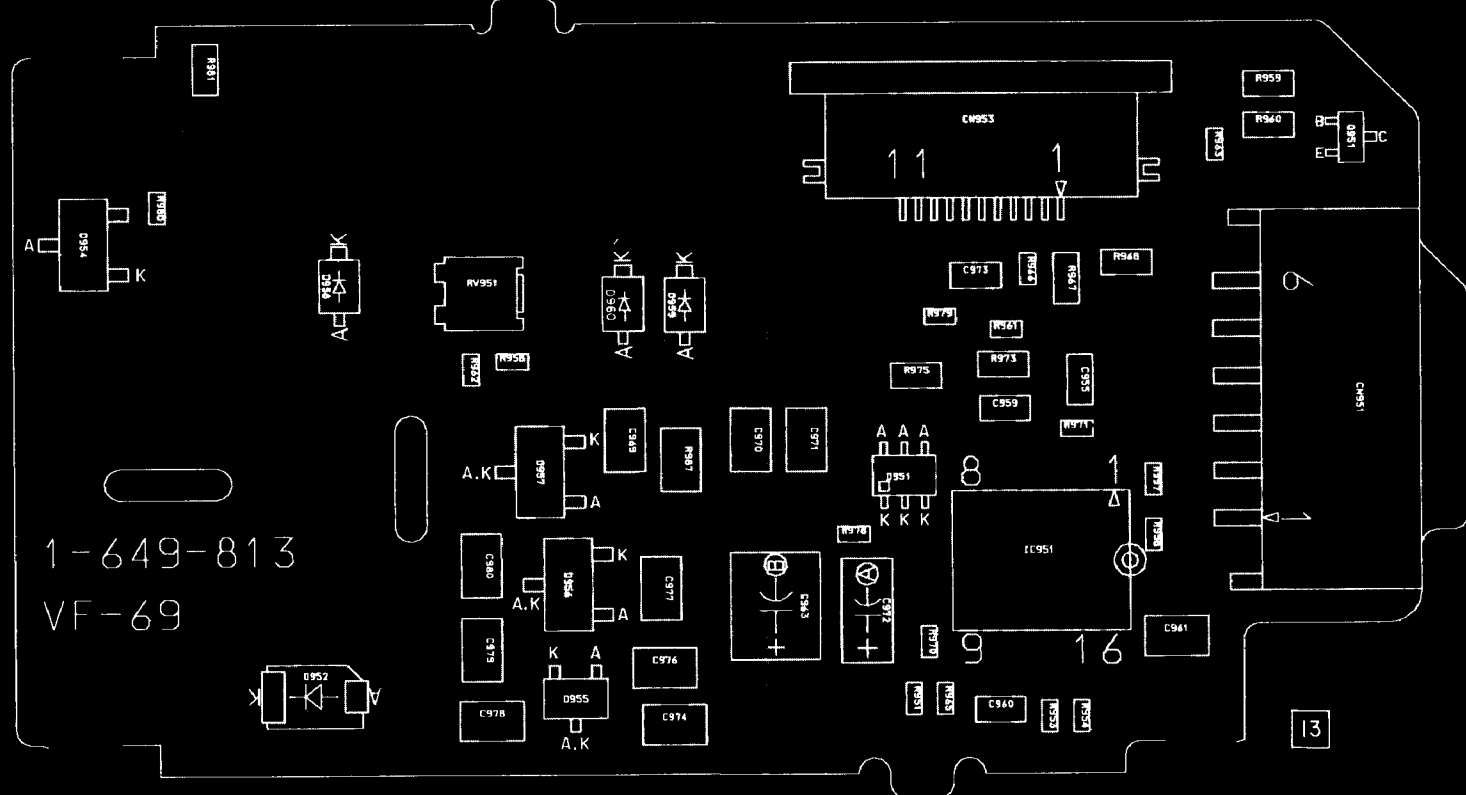
FF-75 BOARD (COMPONENT SIDE)



VF-68 BOARD (CONDUCTOR SIDE)



VF-69 BOARD (CONDUCTOR SIDE)

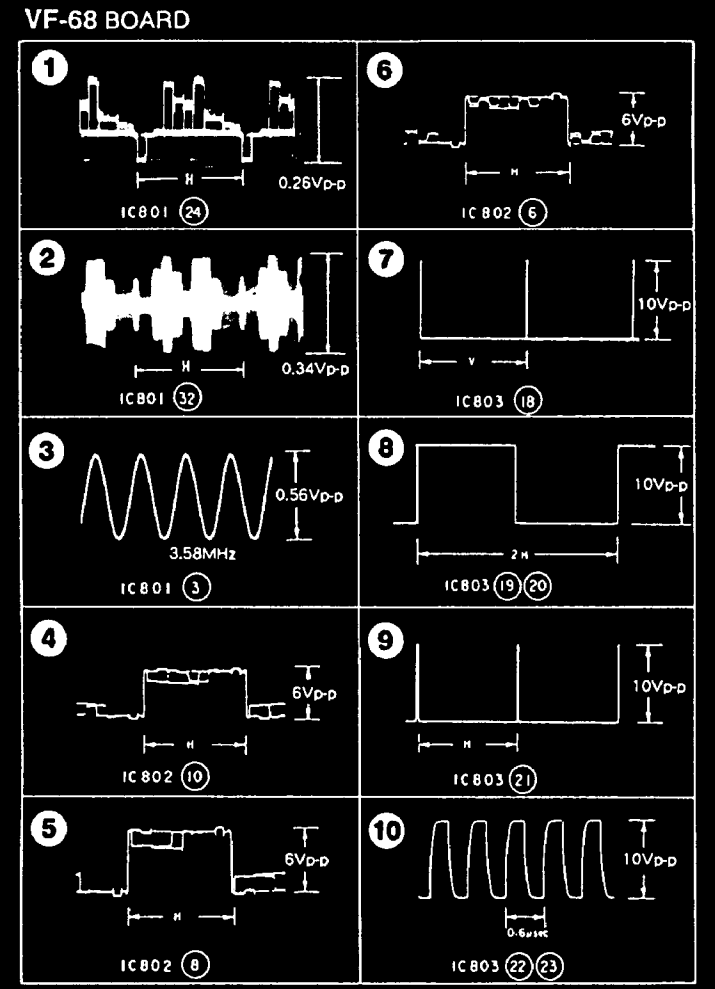
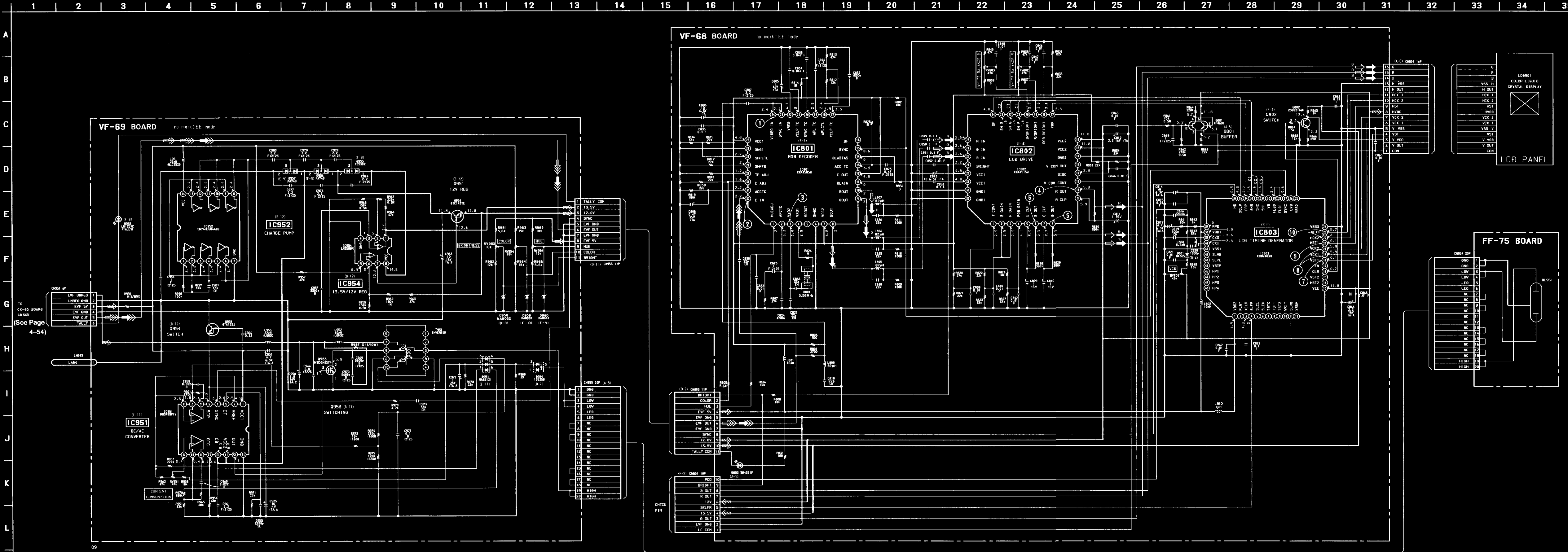


- : Pattern from the side which enables seeing.
- : Pattern of the rear side
- ○ : Through hole is omitted.

Caution:
Pattern face side: Parts on the pattern face side seen from the pattern face are indicated.
Parts face side: Parts on the parts face side seen from the parts face are indicated.

VF-68 (LCD VIDEO, DRIVE) , VF-69 (DC/AC CONVERTER) , FF-75 (BACK LIGHT) SCHEMATIC DIAGRAM (CCD-FX330)

— Ref. No. FF-75 BOARD: 7,000 Series, VF-68 BOARD: 8,000 Series, VF-69 BOARD: 9,000 Series—

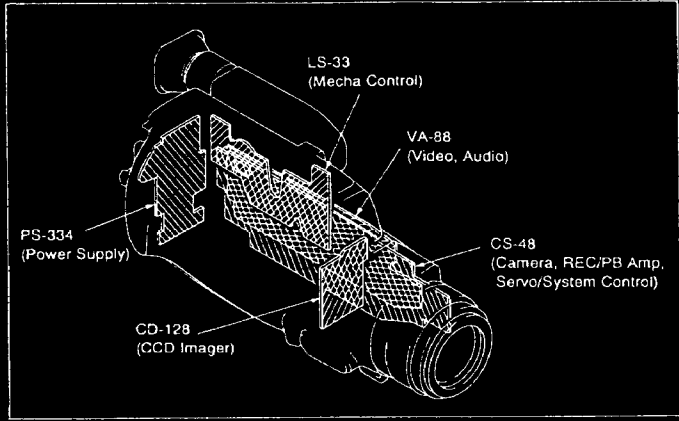


• SIGNAL PATH

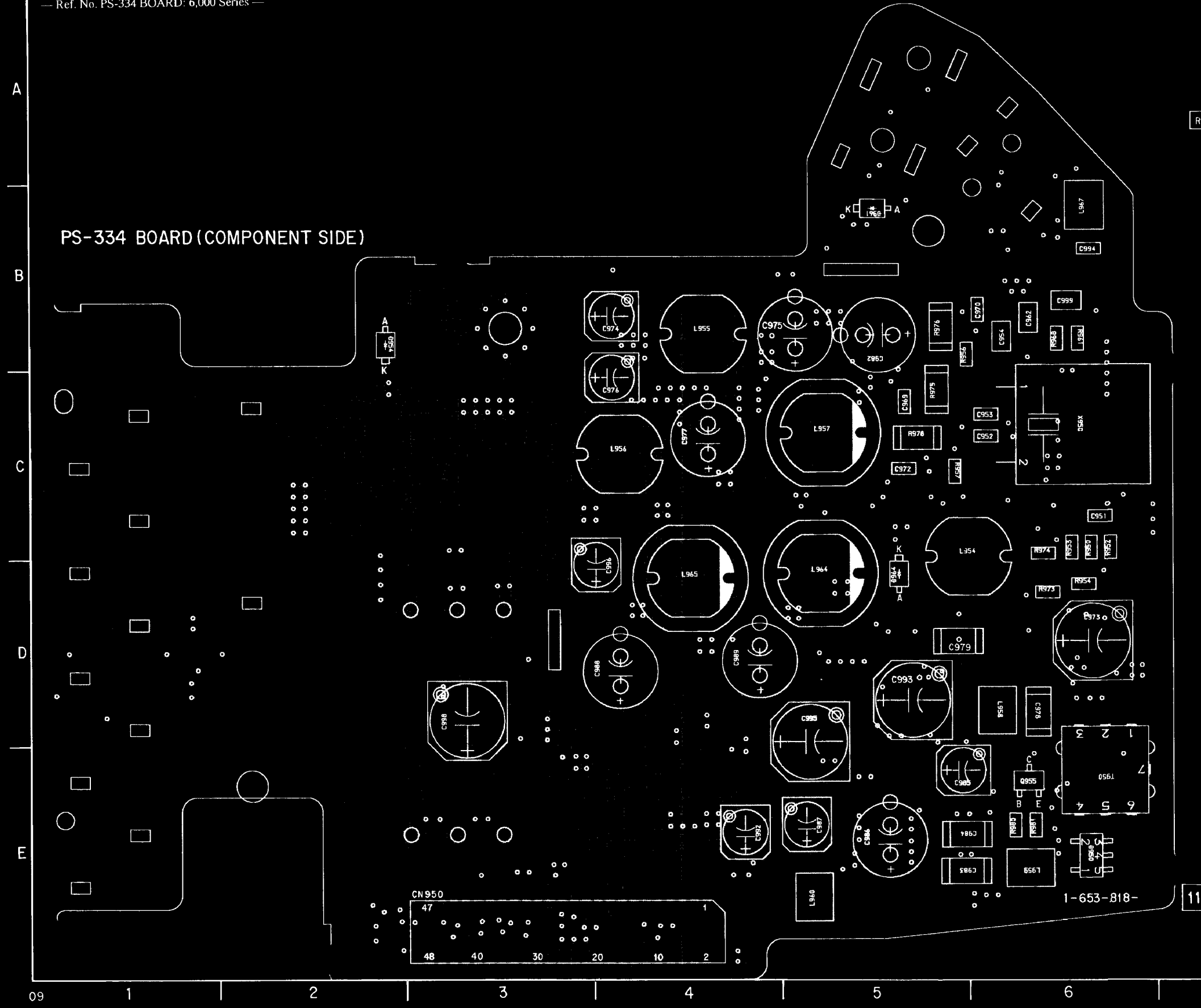
	VIDEO SIGNAL			AUDIO SIGNAL
	CHROMA	Y	Y/CHROMA	
REC	➡		➡➡➡	
PB	➡		➡➡➡	

PS-334 (POWER SUPPLY) PRINTED WIRING BOARD

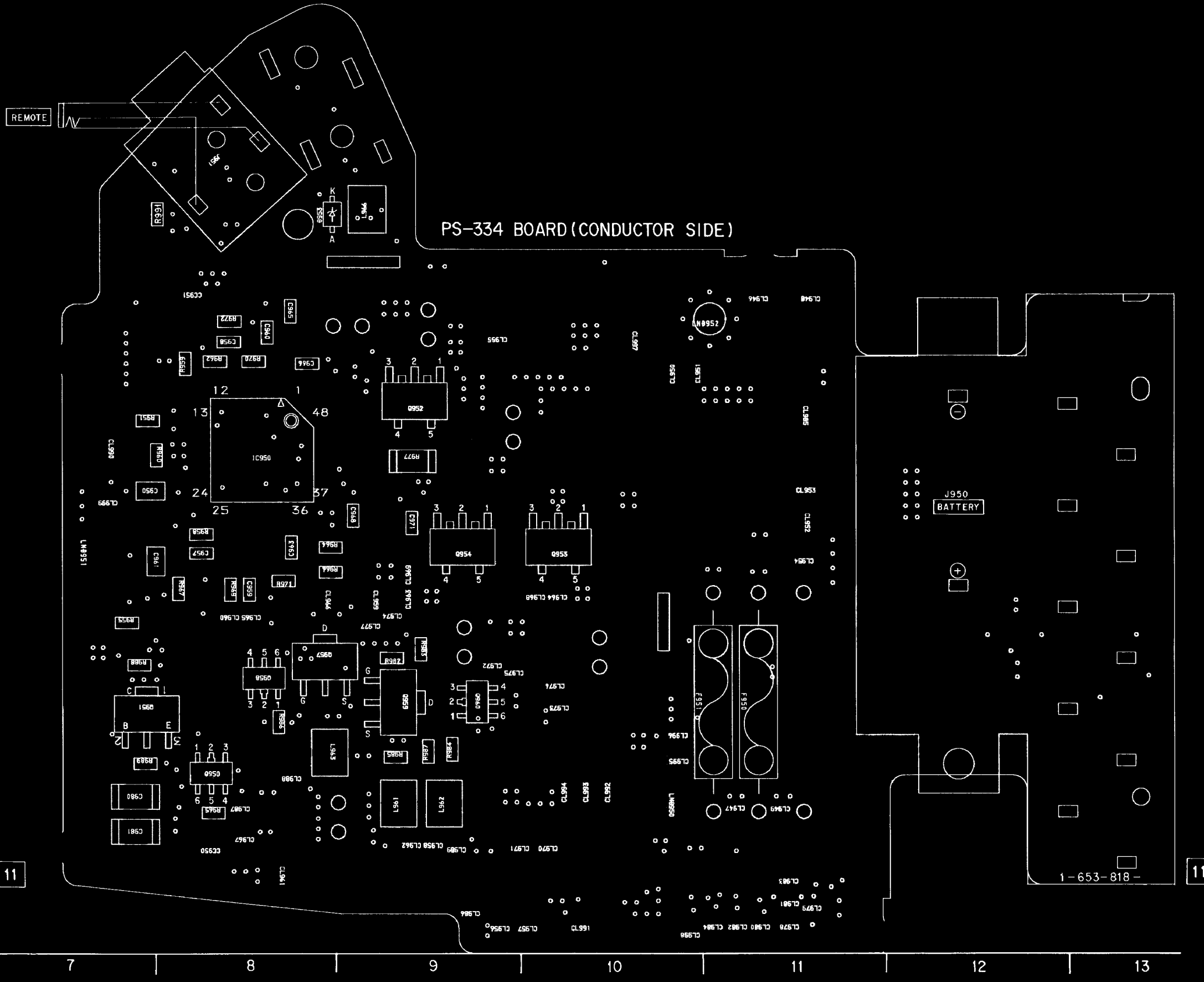
— Ref. No. PS-334 BOARD: 6,000 Series —



PS-334 BOARD (COMPONENT SIDE)

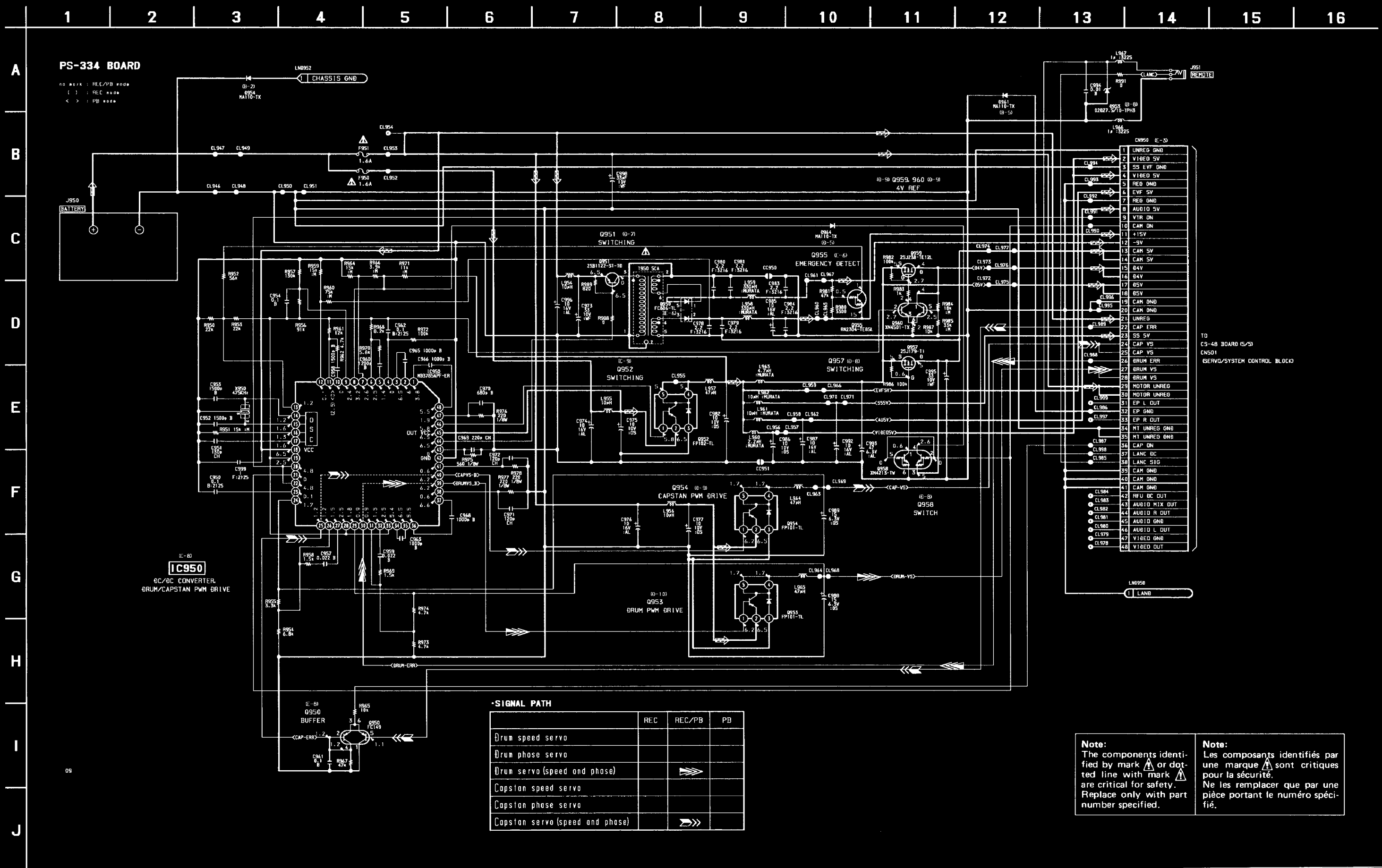


PS-334 BOARD (CONDUCTOR SIDE)



PS-334 (POWER SUPPLY) SCHEMATIC DIAGRAM

— Ref. No. PS-334 BOARD: 6,000 Series —



SECTION 5

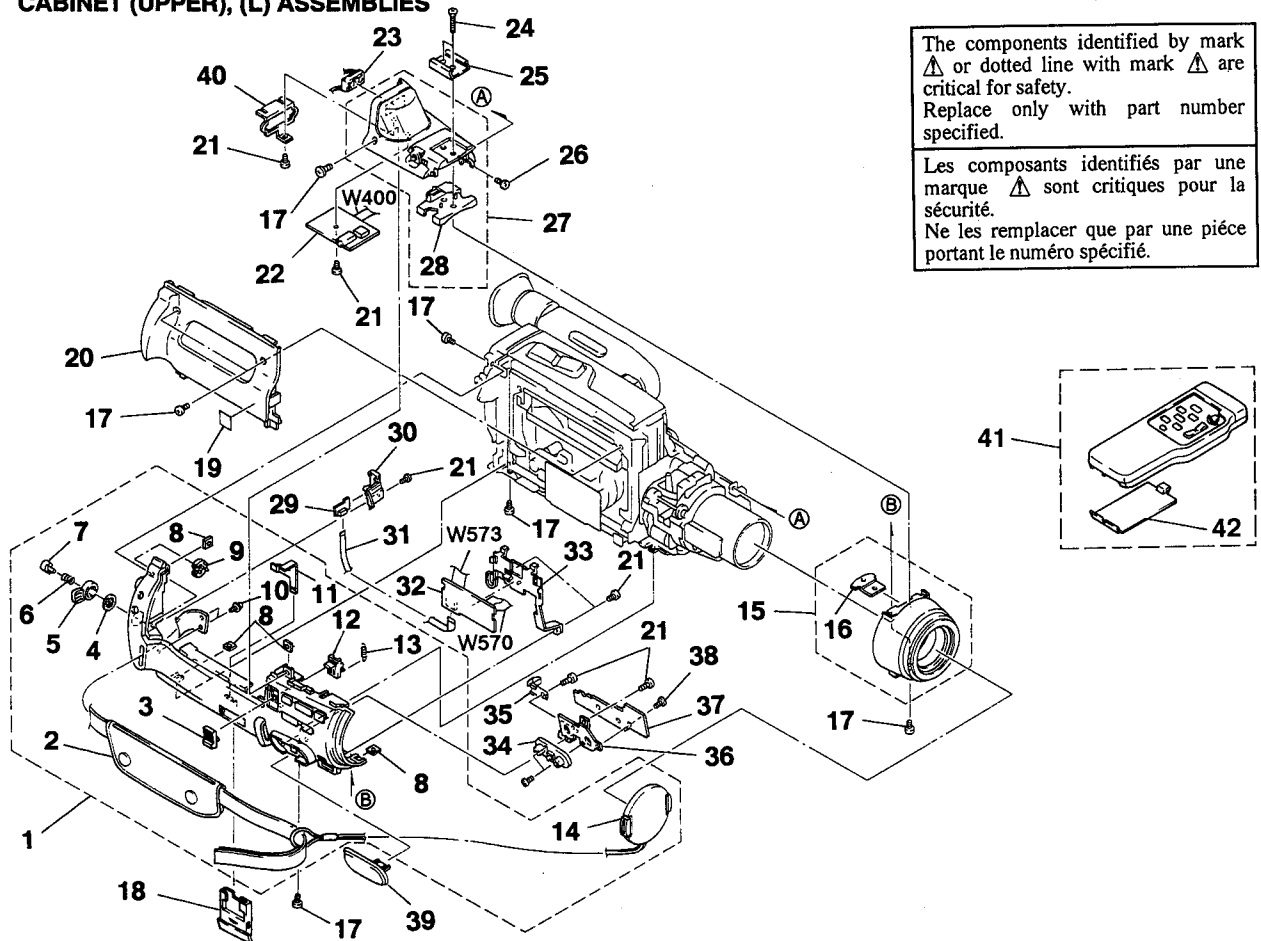
REPAIR PARTS LIST

5-1. EXPLODED VIEWS

NOTE:

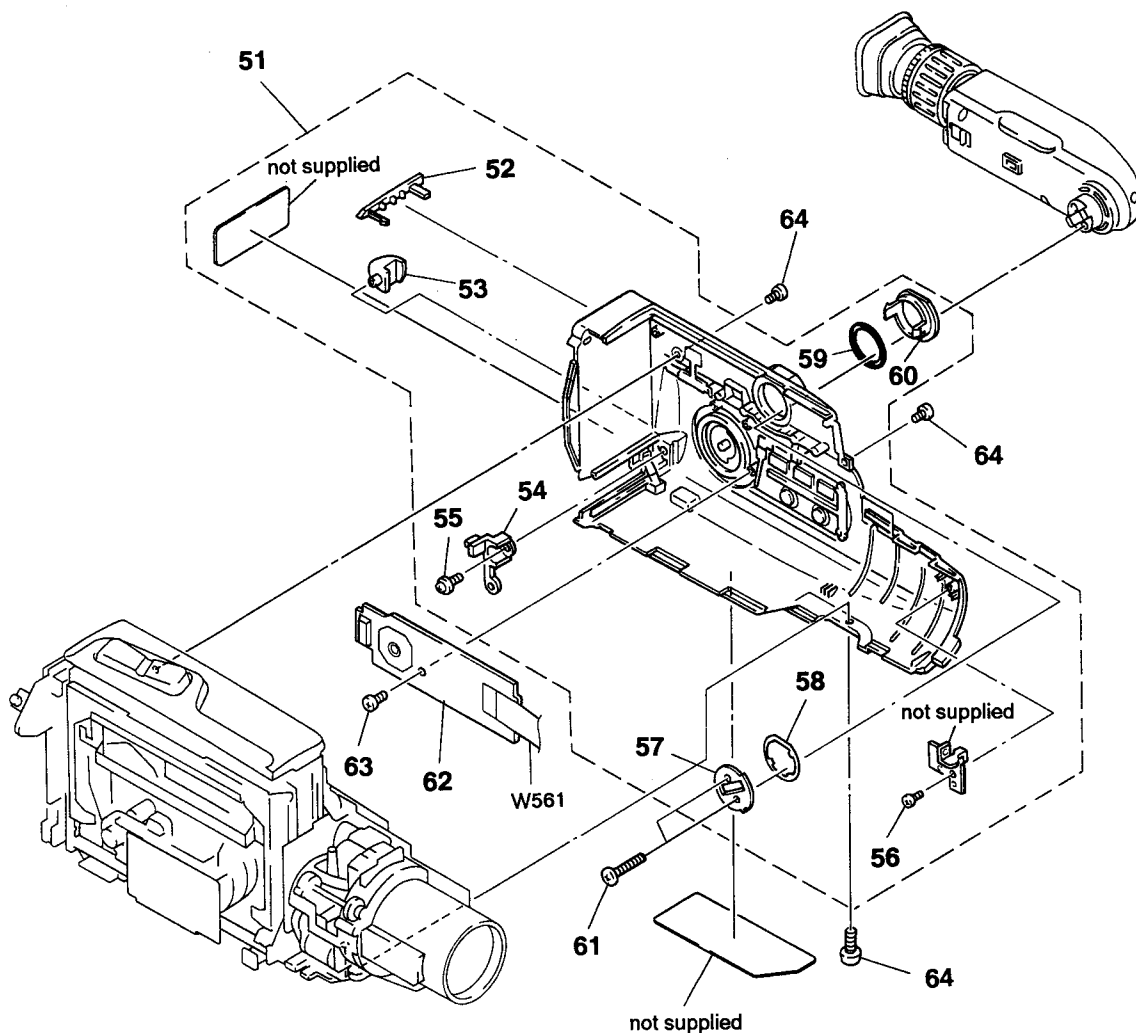
- -XX, -X mean standardized parts, so they may have some difference from the original one.
- Items marked " * " are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.
- The mechanical parts with no reference number in the exploded views are not supplied.
- Hardware (# mark) list is given in the last of this parts list.

5-1-1. CABINET (UPPER), (L) ASSEMBLIES



Ref. No.	Part No.	Description	Remark	Ref. No.	Part No.	Description	Remark
1	A-7082-716-A	CABINET (L) ASSY (FX230/FX330)		* 22	A-7066-169-A	MA-226 BOARD, COMPLETE	
1	A-7082-744-A	CABINET (L) ASSY (FX228)		23	1-542-126-41	MICROPHONE UNIT	
2	3-960-266-01	BELT, GRIP		24	3-948-809-31	SCREW (M2X12)	
3	3-946-195-01	BUTTON, EJECT		25	3-724-511-01	SHOE, ACCESSORY	
4	3-736-364-01	SPRING		26	3-733-912-31	SCREW (M2X4), SPECIAL HEAD	
5	3-942-985-01	KNOB, STAND-BY		27	X-3942-506-1	CABINET (UPPER) ASSY (FX230/FX330)	
6	3-578-221-00	SPRING, COMPRESSION		27	X-3944-433-1	CABINET (UPPER) ASSY (FX228)	
7	3-736-343-01	BUTTON, S/S		28	3-946-234-01	PRISM, REMOTE CONTROL	
8	3-718-233-01	NUT, PLATE		* 29	A-7072-058-A	SW-247 BOARD, COMPLETE	
9	3-946-260-01	HOLDER, STAND-BY KNOB		30	3-946-185-01	HOLDER, SW	
10	3-669-480-11	+ PTPWH 2		31	1-690-604-11	CABLE, FLAT (FFC-33) 4P	
11	1-550-743-11	HOLDER, BATTERY		* 32	A-7072-057-A	VK-37 BOARD, COMPLETE	
12	3-946-194-01	LOCK, EJECT		33	3-946-259-01	HOLDER, VK	
13	3-570-896-00	SPRING, TENSION		34	1-537-402-11	TERMINAL BOARD	
14	A-7091-810-A	CAP BLOCK ASSY, LENS		35	3-947-487-01	PLATE, GROUND, PJ	
15	X-3944-315-1	CABINET (FRONT) ASSY (FX230/FX330)		* 36	3-946-225-01	REINFORCEMENT, PJ	
15	X-3944-427-1	CABINET (FRONT) ASSY (FX228)		* 37	A-7072-059-A	PJ-65 BOARD, COMPLETE	
16	3-946-172-01	SHEET METAL, SHOE		38	3-724-455-01	SCREW (M2X4)	
17	3-719-381-01	SCREW (M2X4)		39	3-946-169-01	LID, JACK	
18	3-946-170-03	HOLDER, LITHIUM		* 40	3-947-523-01	PLATE, FIXED, MICROPHONE	
19	3-703-710-41	STICKER, SONY SYMBOL (12)		41	1-467-574-21	REMOTE COMMANDER (RMT-708) (FX330)	
20	X-3944-316-1	LID ASSY, CASSETTE (FX230)		42	3-958-131-01	LID, BATTERY CASE (for RMT-708)	
20	X-3944-426-1	LID ASSY, CASSETTE (FX330)		W400	1-650-348-11	FP-110 FLEXIBLE BOARD	
20	X-3944-428-1	LID ASSY, CASSETTE (FX228)		W570	1-647-493-11	FP-5 FLEXIBLE BOARD	
21	3-948-339-01	SCREW (BTP) (2X5), HEAD		W573	1-650-349-11	FP-111 FLEXIBLE BOARD	

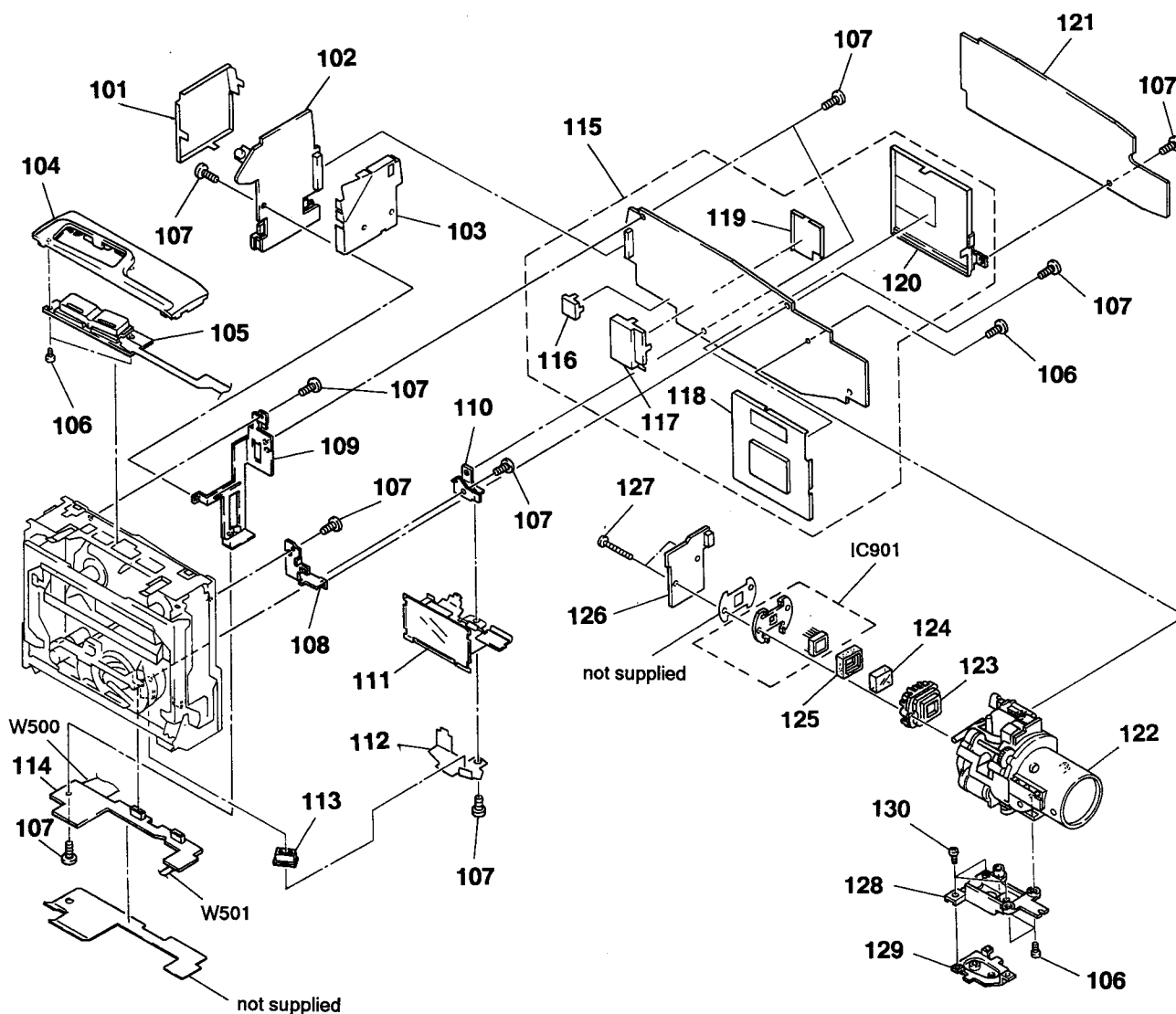
5-1-2. CABINET (R) ASSEMBLY



Ref. No.	Part No.	Description	Remark
51	X-3944-319-1	CABINET (R) ASSY (FX230/FX330)	
51	X-3944-432-1	CABINET (R) ASSY (FX228)	
52	3-946-256-01	CAP, POWER (FX230/FX330)	
52	3-946-256-21	CAP, POWER (FX228)	
53	3-946-246-01	BUTTON, BATTERY RELEASE (FX230/FX330)	
53	3-946-246-21	BUTTON, BATTERY RELEASE (FX228)	
54	3-946-250-01	CLAW, BATTERY LOCK	
55	3-669-480-21	+ PTPWH 2	
56	3-713-790-01	SCREW (M2X5), TAPPING, P3	
57	3-946-254-01	PLATE, LOCK, TILT	

Ref. No.	Part No.	Description	Remark
58	3-946-255-01	SPRING, LEAF, TILT	
59	3-946-253-01	RING, TILT	
60	3-946-252-01	SLEEVE, EVF	
61	3-740-546-51	SCREW (M2X9) (FX228/FX230)	
61	3-740-546-61	SCREW (M2X10.5) (FX330)	
* 62	A-7072-056-A	CK-65 BOARD, COMPLETE (FX228/FX230)	
* 62	A-7072-086-A	CK-65 BOARD, COMPLETE (FX330)	
63	3-948-339-01	SCREW (BTP) (2X5), HEAD	
64	3-719-381-01	SCREW (M2X4)	
W561	1-690-602-11	CABLE, FLAT (FFC-23) 16P	

5-1-3. MAIN BOARDS ASSEMBLY

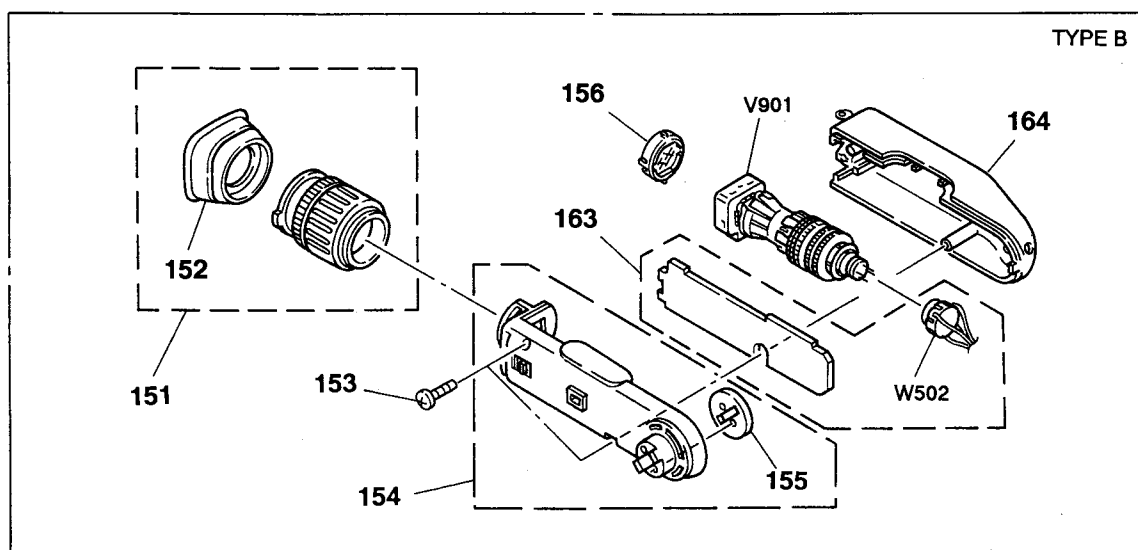
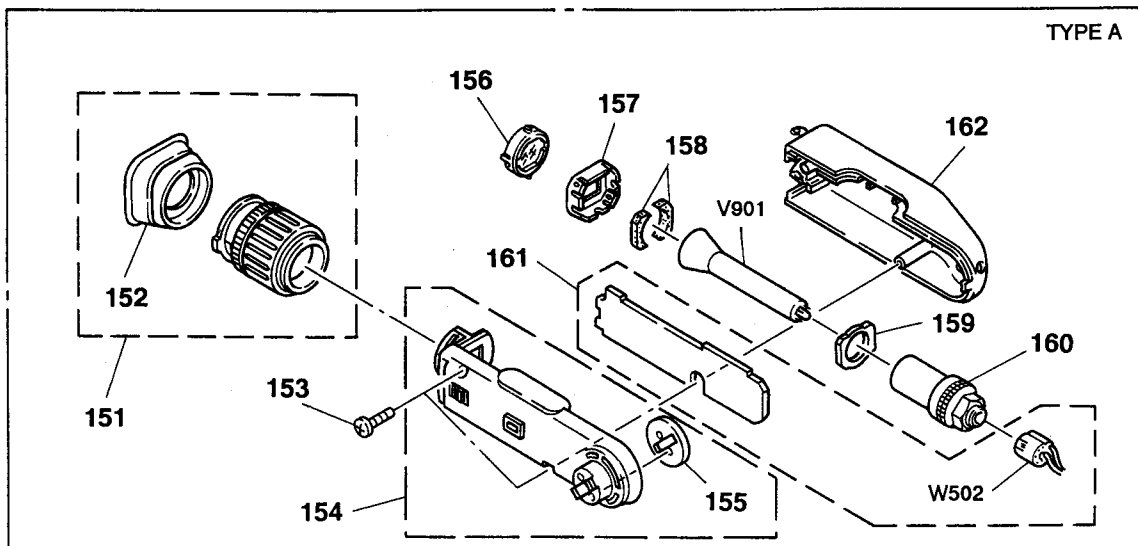


Be sure to read "Note on the CCD Imager replacement" on page 4-9 when changing the CCD imager.

Ref. No.	Part No.	Description
* 101	3-946-183-01	CASE (MAIN), SHIELD, PS
* 102	A-7066-163-A	PS-334 BOARD, COMPLETE
* 103	X-3941-499-1	SHIELD (LID) ASSY, PS
104	X-3941-320-1	LID ASSY, LS (FX230/FX330)
104	X-3941-924-1	LID ASSY, LS (FX228)
105	1-692-257-21	SWITCH, PUSH (ZOOM)
106	3-948-339-01	SCREW (BTP) (2X5), HEAD
107	3-724-455-01	SCREW (M2X4)
* 108	3-952-645-01	HOLDER (F)
* 109	X-3942-639-1	HOLDER (R) ASSY
110	3-946-175-01	HOLDER (B), CS
111	X-3941-522-1	PLATE ASSY, SHIELD, DRUM
112	1-642-187-11	FP-426 FLEXIBLE BOARD
113	1-691-471-11	CONNECTOR, TRANSLATION 11P
* 114	A-7066-166-A	SL-45 BOARD, COMPLETE
* 115	A-7066-164-A	CS-48 BOARD, COMPLETE
* 116	3-946-179-01	CASE (MAIN), SHIELD, FE
* 117	3-948-499-01	CASE (MAIN), SHIELD, RP

Remark	Ref. No.	Part No.	Description	Remark
	* 118	X-3941-498-1	SHIELD (LID) ASSY, CAMERA	
	* 119	3-946-178-01	CASE (LID), SHIELD, RP	
	* 120	X-3941-314-1	SHIELD ASSY, CAMERA	
	* 121	A-7066-165-A	VA-88 BOARD, COMPLETE (FX228/FX230)	
	* 121	A-7066-199-A	VA-88 BOARD, COMPLETE (FX330)	
	122	1-547-586-21	LENS, ZOOM (VCL-6110WE)	
	123	3-946-856-01	ADAPTOR (H), CCD FITTING	
	124	1-547-558-21	FILTER BLOCK, OPTICAL	
	125	3-946-857-01	RUBBER (S), SEAL	
	* 126	A-7066-162-A	CD-128 BOARD, COMPLETE	
	127	3-947-268-01	SCREW (P TIGHT) (2), TAPPING	
	128	3-946-223-01	HOLDER (C), LENS	
	129	3-946-224-01	SHEET METAL, TRIPOD	
	130	3-719-381-01	SCREW (M2X4)	
	IC901	A-7030-368-A	CCD BLOCK ASSY (054 SERVICE) (CCD IMAGER)	
	W500	1-644-461-31	FP-600 FLEXIBLE BOARD	
	W501	1-642-186-11	FP-437 FLEXIBLE BOARD	

5-1-4. EVF BLOCK ASSEMBLY (FX228/FX230)



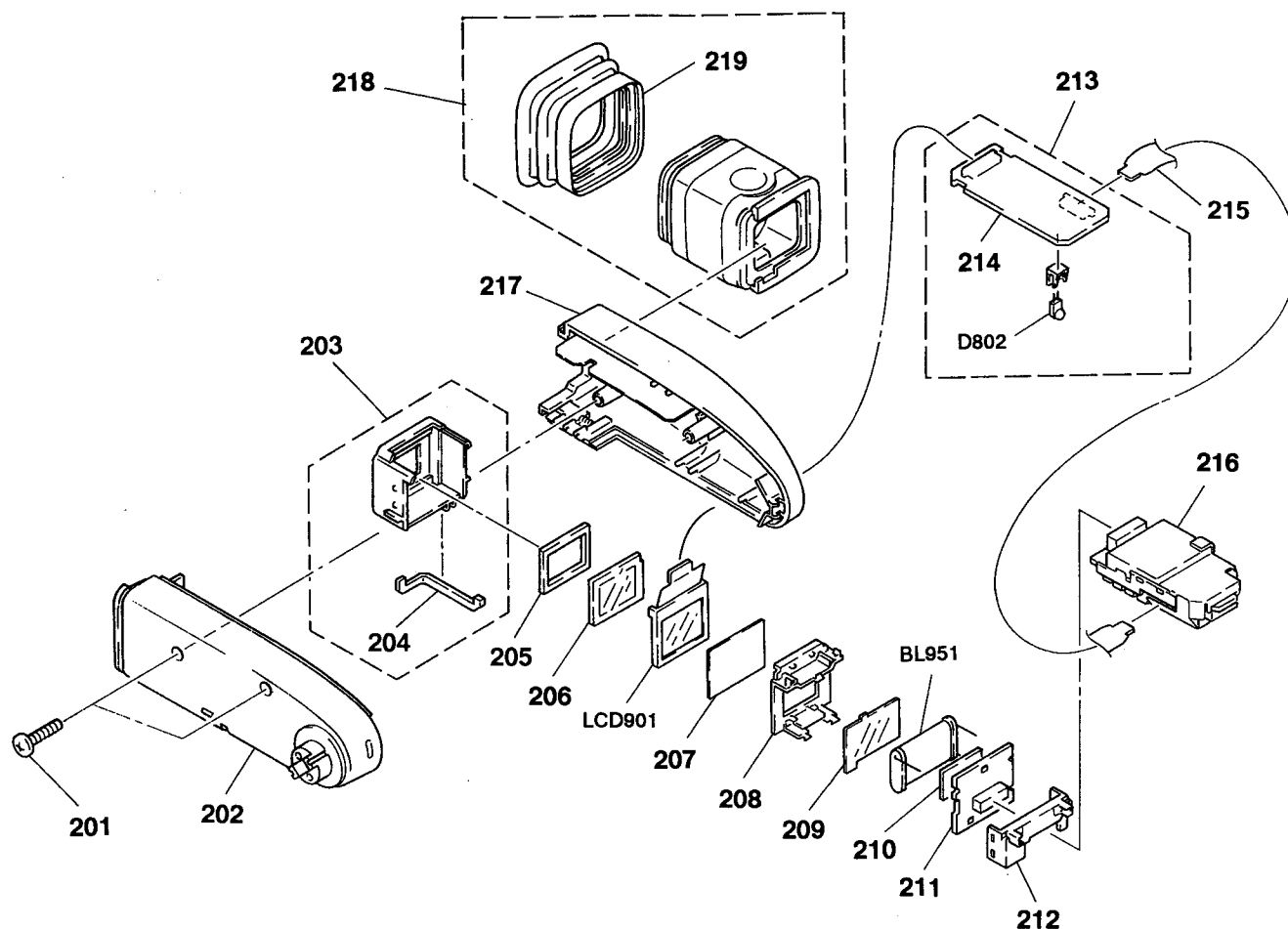
The components identified by mark  or dotted line with mark  are critical for safety. Replace only with part number specified.

Les composants identifiés par une marque  sont critiques pour la sécurité. Ne les remplacer que par une pièce portant le numéro spécifié.

VF-44 board: TYPE A
VF-51 board: TYPE B

Ref. No.	Part No.	Description	Remark	Ref. No.	Part No.	Description	Remark
151	A-7081-897-C	HOLDER BLOCK ASSY, FINDER (FX228/FX230)		* 162	X-3944-338-1	CABINET (R) ASSY (M), EVF (TYPE A) (FX230)	
152	3-946-212-01	EYE CUP (FX228/FX230)		* 162	X-3944-431-1	CABINET (R) ASSY (M), EVF (TYPE A) (FX228)	
153	3-713-790-31	SCREW (M2X8), TAPPING, P3		* 163	A-7066-168-A	VF-51 BOARD, COMPLETE (TYPE B)	(FX228/FX230)
154	X-3944-317-1	CABINET (L) ASSY, EVF (FX230)					
154	X-3944-429-1	CABINET (L) ASSY, EVF (FX228)					
155	3-946-202-01	JOINT, EVF (FX228/FX230)		164	X-3944-318-1	CABINET (R) ASSY, EVF (TYPE B) (FX230)	
156	A-7081-905-E	LENS ASSY, VF (FX228/FX230)		164	X-3944-430-1	CABINET (R) ASSY, EVF (TYPE B) (FX228)	
157	3-946-203-01	HOLDER, CRT (TYPE A) (FX228/FX230)		 V901	1-452-600-11	CRT ASSY (TYPE B) (FX228/FX230)	
158	3-946-205-01	PACKING, CRT (TYPE A) (FX228/FX230)		 V901	1-546-091-11	CATHODE-RAY TUBE, B/W (TYPE A)	(FX228/FX230)
159	3-946-204-01	COVER, CRT (TYPE A) (FX228/FX230)		 W502	1-526-978-51	SOCKET ASSY, CRT (TYPE A) (FX228/FX230)	
 160	1-451-310-21	DEFLECTION YOKE (B/W) (TYPE A) (FX228/FX230)		 W502	1-540-019-51	SOCKET ASSY, CRT (TYPE B) (FX228/FX230)	
* 161	A-7066-167-A	VF-44 BOARD, COMPLETE (TYPE A)	(FX228/FX230)				

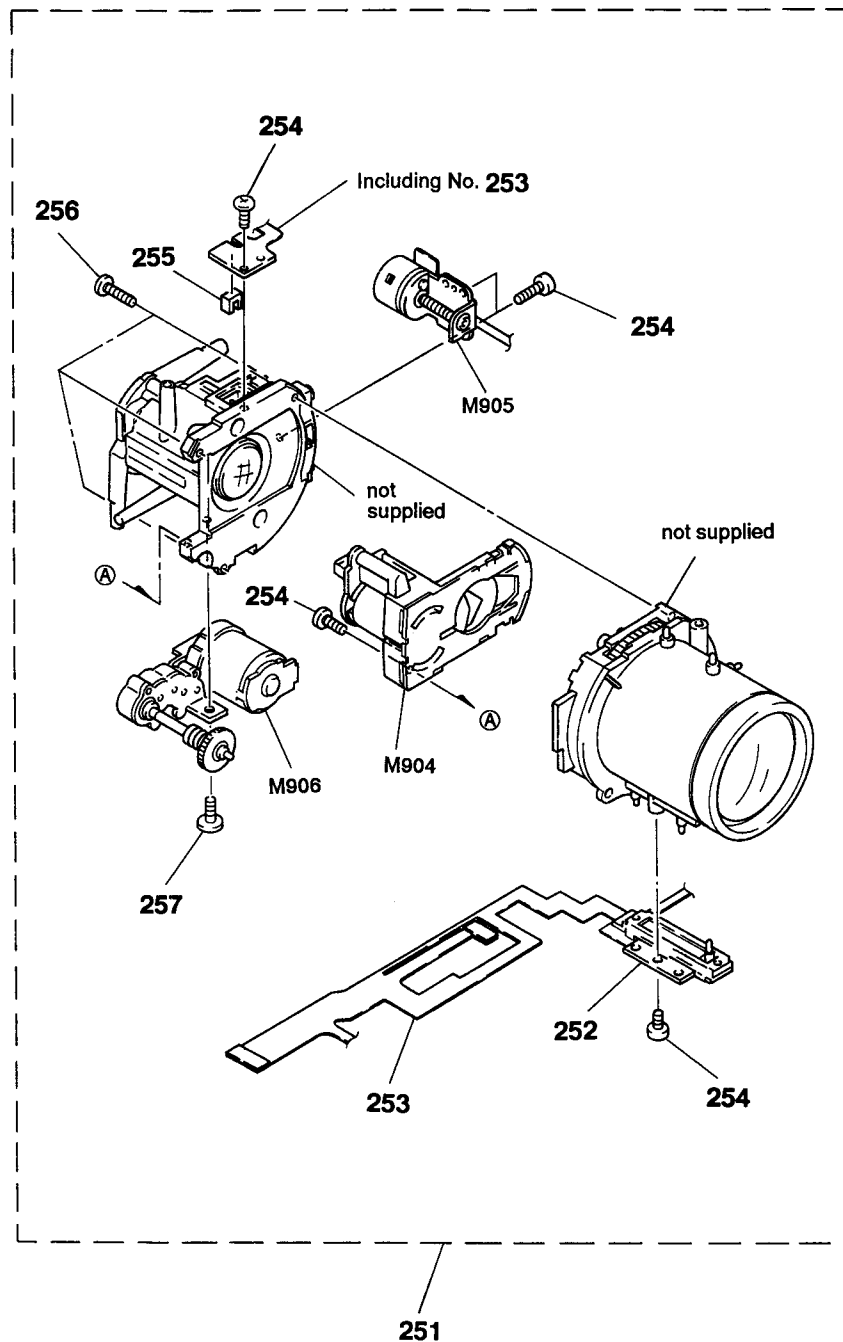
5-1-5. COLOR EVF BLOCK ASSEMBLY (FX330)



Ref. No.	Part No.	Description
201	3-713-790-31	SCREW (M2X8), TAPPING, P3
202	X-3944-425-1	CABINET (L) ASSY, EVF (FX330)
203	X-3943-368-1	HOLDER ASSY, LCD (FX330)
* 204	3-947-711-01	GUIDE, LIGHT, INNER TALLY (FX330)
* 205	3-955-339-11	SPACER, LCD (FX330)
* 206	3-955-340-01	FILTER, LCD (FX330)
207	3-958-280-01	ILLUMINATOR, BL (FX330)
208	X-3943-227-1	HOLDER ASSY, BL (FX330)
* 209	3-955-570-01	PLATE, CONDENSE, BL (FX330)
* 210	3-955-573-01	SPACER (E), BL (FX330)
* 211	A-7071-913-A	FF-75 BOARD, COMPLETE (FX330)

Ref. No.	Part No.	Description
212	3-947-714-11	HOLDER (R), LCD (FX330)
* 213	A-7063-779-A	VF-68 BOARD, COMPLETE (FX330)
214	3-942-888-01	HOLDER, LED (FX330)
215	1-643-806-11	FP-539 FLEXIBLE BOARD (FX330)
* 216	A-7063-780-A	VF-69 BOARD, COMPLETE (FX330)
217	X-3943-367-1	CABINET (R) ASSY, EVF (FX330)
218	X-3943-369-1	HOLDER ASSY, FINDER (FX330)
219	3-948-162-01	EYE CUP (FX330)
BL951	1-519-746-21	TUBE, FLUORESCENT (0.7 INCH) (FX330)
D802	8-719-984-02	LED BR4371F (TALLY) (FX330)
LCD901	8-753-011-00	LCX003BK-1 (FX330)

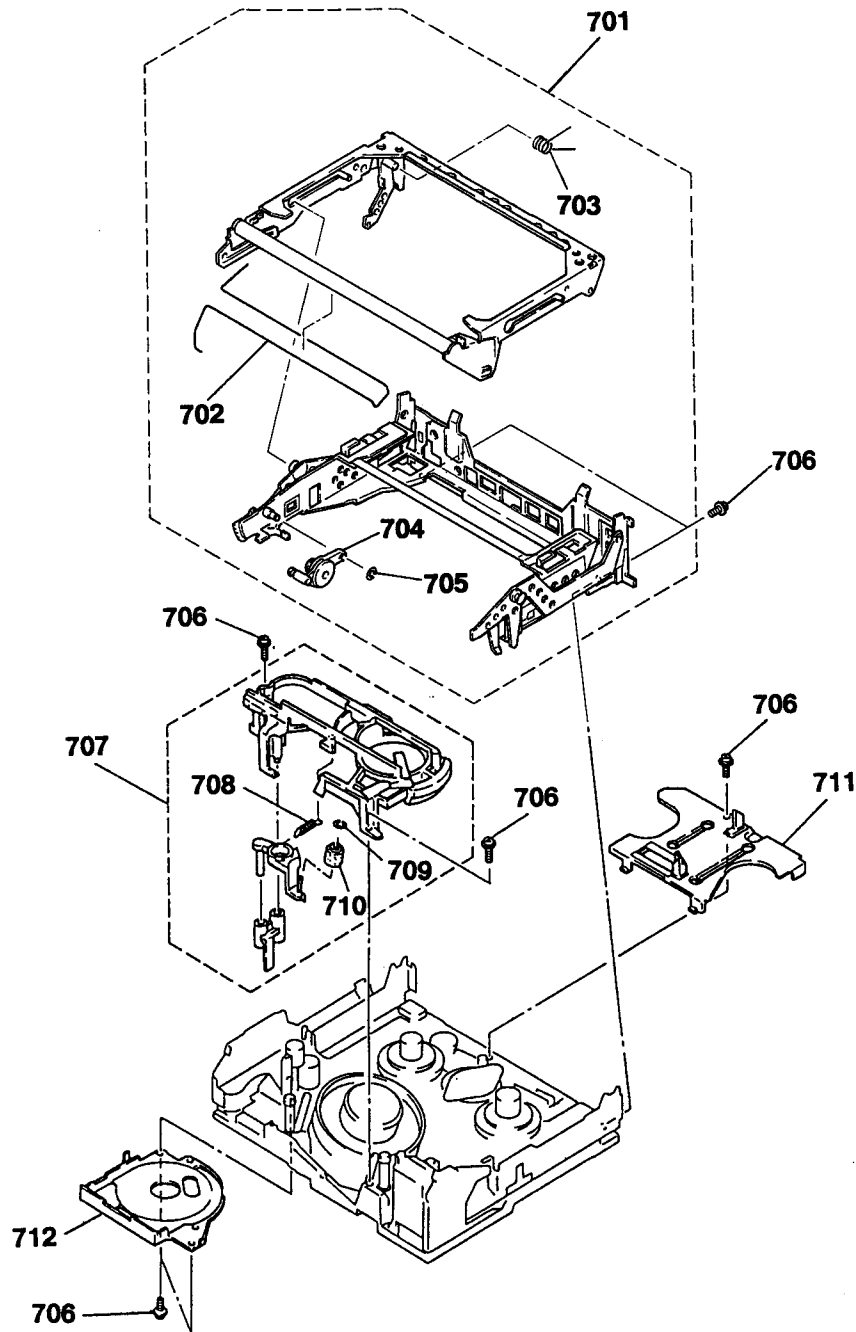
5-1-6. ZOOM LENS ASSEMBLY (VCL-6110WE)



Ref. No.	Part No.	Description
251	1-547-586-21	LENS, ZOOM (VCL-6110WE)
252	3-708-610-01	ENCORDER, ZOOM
253	3-708-614-02	FLEXIBLE BOARD
254	3-708-302-01	SCREW BT3 P1.7X4
255	3-708-613-01	REFERENCE PIN, FB (FOCUS END)

Ref. No.	Part No.	Description
256	3-708-617-01	SCREW BT3 P1.7X7
257	3-708-618-01	SCREW BT3 P1.7X5
M904	3-708-611-01	METER ASSY, IRIS
M905	3-708-746-01	MOTOR ASSY, STEPPING (FOCUS)
M906	3-708-609-11	MOTOR ASSY, ZOOM

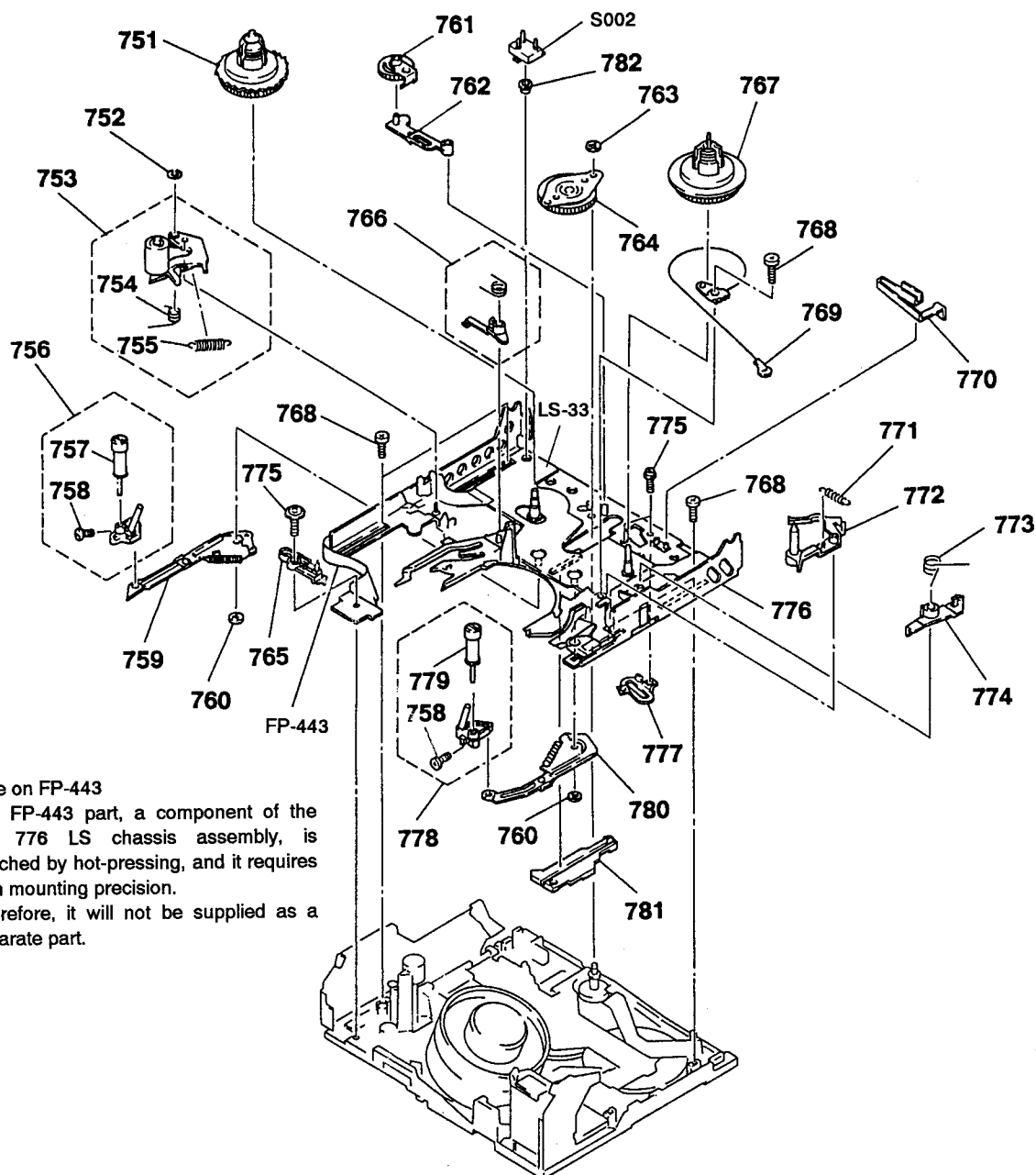
5-1-7. CASSETTE COMPARTMENT ASSEMBLY



Ref. No.	Part No.	Description
701	A-7040-312-K	CASSETTE COMPARTMENT BLOCK ASSY
702	3-945-773-01	BAR, TORSION
703	3-945-771-01	SPRING, TORSION
704	X-3941-287-2	DAMPER ASSY
705	3-315-384-31	WASHER, STOPPER
706	3-947-503-01	SCREW (M1. 4X2. 5)

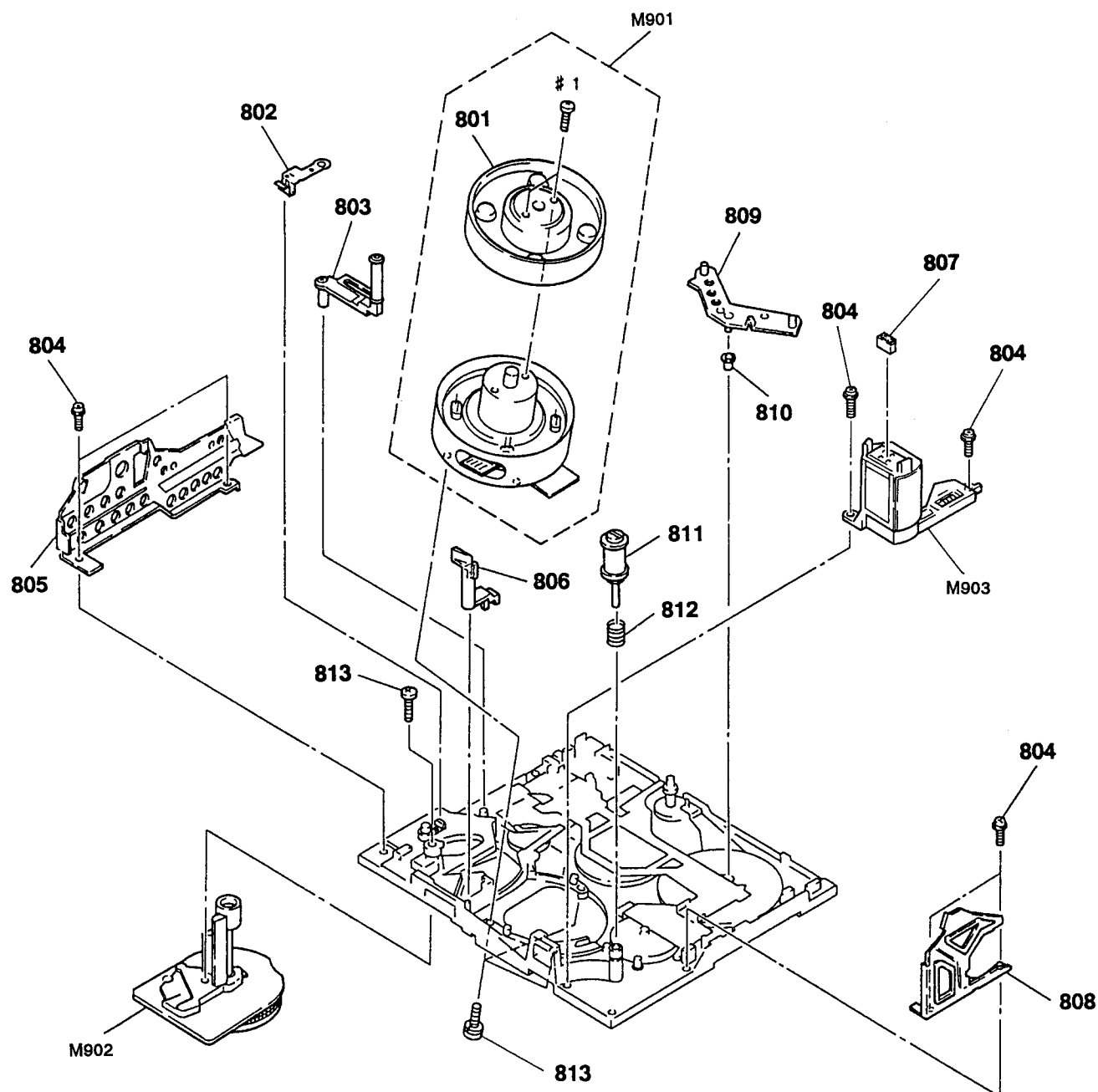
Ref. No.	Part No.	Description
707	A-7040-309-A	PROTECT (BASE) BLOCK ASSY
708	3-945-760-01	SPRING, TENSION
709	3-321-393-01	WASHER, STOPPER
710	X-3166-813-1	ROLLER ASSY, HC
711	X-3941-280-1	RETAINER ASSY; GOOSENECK
712	3-945-733-01	COVER, CAPSTAN

5-1-8. LS CHASSIS ASSEMBLY



Ref.No.	Part No.	Description	Remark	Ref.No.	Part No.	Description	Remark
751	X-3941-274-1	TABLE ASSY, REEL, T		768	3-945-756-01	SCREW (M1.4X3)	
752	3-331-007-21	WASHER		769	X-3941-277-1	STRING BLOCK ASSY	
753	X-3941-271-5	ARM ASSY, PINCH		770	3-945-801-01	BRAKE, S SOFT	
754	3-945-743-01	SPRING, TORSION					
755	3-945-783-01	SPRING, TENSION		771	3-954-327-01	SPRING, TENSION	
756	A-7040-307-A	GUIDE (BASE) (T) BLOCK ASSY		772	X-3941-276-1	TG1 ASSY	
757	X-3941-424-1	ROLLER ASSY, TG6		773	3-945-752-01	SPRING, TORSION	
758	3-947-504-01	SCREW (M1.2X2)		774	3-945-799-01	BRAKE, S HARD	
759	X-3941-267-1	ARM (T) ASSY, GUIDE		775	3-947-503-01	SCREW (M1.4X2.5)	
760	3-669-465-00	WASHER (1.5), STOPPER		776	X-3943-307-1	CHASSIS ASSY, LS	
761	X-3941-273-1	SOFT ASSY, T		777	3-945-784-01	PLATE, CAM, LS	
762	3-945-753-01	ARM, T SOFT		778	A-7040-306-A	GUIDE (BASE) (S) BLOCK ASSY	
763	3-726-829-01	WASHER, STOPPER		779	X-3941-269-1	ROLLER ASSY, TG3	
764	X-3941-279-5	GEAR ASSY, GOOSENECK		780	X-3941-266-1	ARM (S) ASSY, GUIDE	
765	3-947-644-01	RETAINER, TG5 (BASE)		781	3-945-837-01	SLIDER, GL	
766	A-7040-321-A	CLAW BLOCK ASSY, T HARD		782	3-949-881-01	SLEEVE	
767	X-3944-116-1	TABLE ASSY, S REEL		S002	1-572-987-11	SWITCH, PUSH (3 KEY)	
						(REC PROOF, ME/MP, MP/MP-HG)	

5-1-9. MECHANISM CHASSIS ASSEMBLY (1)



Ref. No.	Part No.	Description
801	A-7049-501-A	DRUM ASSY, UPPER (DGR-78-R)
802	3-945-822-01	SPRING, LEAF, TG7 ARM
803	A-7040-305-A	ARM BLOCK ASSY, TG7
804	3-947-503-01	SCREW (M1.4X2.5)
805	X-3941-255-1	PLATE (T) ASSY, SIDE
806	3-945-735-01	ARM, HC CONVERSION
807	1-568-323-11	CONNECTOR, BOARD TO BOARD 4P
808	3-945-691-01	PLATE (S), SIDE
809	3-945-701-01	ARM, LS

Ref. No.	Part No.	Description
810	3-945-702-01	ROLLER, LS
811	X-3941-262-1	ROLLER ASSY, TG2
812	3-956-651-01	SPRING, COMPRESSION
813	3-686-493-01	SCREW (M2X5), P1
M901	A-7048-564-A	DRUM ASSY (DGH-78A-R)
M902	8-835-477-01	MOTOR, DC SCE-0101A (CAPSTAN)
M903	A-7040-304-A	MOTOR BLOCK ASSY, LM (LOADING)

6-1. CAMERA MICROPROCESSOR PIN FUNCTION (IC709 ON CS-48 BOARD: CXP80624-299Q/455Q)

Pin No.	Signal	I/O	Function
1	EPROM DI	O	Not used.
2	EPROM SCK	O	
3	ZOOM M REV	O	Zoom motor control signal. Normally "H". 16.6 msec period PWM signal when rotating to WIDE.
4	ZOOM M FWD	O	Zoom motor control signal. Normally "H". 16.6 msec period PWM signal when rotating to TELE.
5			Not used.
6			
7			
8			
9			
10	CORE RESET	O	Camera core (IC707 on CS-48 board) reset signal. Normally "H". "L" when reset.
11	PDR RESET	O	Focus predriver (IC706 on CS-48 board) reset signal. Normally "H". "L" when reset.
12			Not used.
13			
14	OPD RESET	O	OPD (IC705 on CS-48 board) reset signal. "H": camera mode. "L": VTR mode.
15			Not used.
16			
17			
18			
19			
20			
21			
22			
23			
24	EPROM BUSY	I	BUSY signal from EEPROM. Normally "H". "L" pulse when data reading/writing.
25			Not used.
26			
27	PD3/C	I	Fixed to +5V.
28	TA/CA	I	
29	WIDE END		Fixed to +5V.
30	FOC END FAR	I	Focus end FAR sensor input. Normally "L".
31	CAM ON	O	Power supply control signal. Normally "L".
32			Not used.
33			
34			
35			
36			
37			
38	FOC END LED	O	Focus end sensor LED control signal. Normally "H" (4.4V).
39	MP		Connected to GND.
40	CAM RESET	I	Reset signal input. Normally "H". "L" when reset.
41	VSS		GND
42	XTAL	O	12 MHz clock oscillation circuit
43	EXTAL	I	

Pin No.	Signal	I/O	Function
44	CS CAM	I	Chip select signal from mode control microprocessor.
45	VTR SO	I	Serial data input from mode control microprocessor.
46	VTR SI	O	Serial data output from mode control microprocessor.
47	VTR SCK	I	Serial data transfer clock
48			Not used.
49			
50			
51			
52	AVSS		GND
53	AVREF		Analog input port reference voltage (5V)
54	AVDD		Analog input port voltage (5V)
55			Connected to GND.
56			Not used.
57			
58			
59	ZOOM SW	I	Zoom key input. 4.3V: F. TELE, 3.1V: TELE, 0.7V: F. WIDE, 1.9V: WIDE, 2.5V: no input.
60	ZOOM POS X4	I	Zoom position voltage. approx. 0V (WIDE end) to approx. 3V (TELE end).
61	HALL A/D	I	Hall voltage. approx. 1V (iris open) to approx. 3V (iris close).
62	ZOOM POSITION A/D	I	Zoom position voltage. approx. 0.2V (WIDE end) to approx. 2.4V (TELE end).
63			Connected to 5V.
64			
65			
66			
67			
68			
69			
70	AF BUSY	I	AF busy signal
71	PE7/DAB1		Not used.
72	PE6/DAB0		
73	PE5/DAA1		
74	PE4/DAA0		
75	IRIS PWM	O	Iris control signal. 25.5 μ sec period PWM signal
76	ZP PWM	O	Zoom position detection voltage output. 25.5 μ sec period PWM signal
77	AJST	I	Adjustment timing pulse input. Normally "H".
78	VD	I	VD signal input from sync generator
79	CAM SI	I	Serial data input
80	CAM SO	O	Serial data output
81	CAM SCK	O	Serial data transfer clock
82			Not used.
83			
84			
85			Connected to +5V.
86	PI O		
87	PKO		

Pin No.	Signal	I/O	Function
88	GND		GND
89	VDD		+5V power supply
90	VPP		
91			Not used.
92	CS PDR	O	Chip select signal to focus predriver (IC706 on CS-48 board)
93	CS CAM D/A	O	Chip select signal to camera EVR (IC702 on CS-48 board)
94	CS ROM	O	Chip select signal to EEPROM (IC712 on CS-48 board)
95	CS OPD	O	Chip select signal to OPD (IC705 on CS-48 board)
96	NTSC	O	NTSC: "L", PAL: "H"
97	CS CORE	O	Chip select signal to camera core (IC707 on CS-48 board)
98	CS TG	O	Select signal to timing generator (IC801 on CS-48 board)
99			Not used.
100			

6-2. MECHANISM CONTROL MICROPROCESSOR PIN FUNCTION (IC503 ON CS-48 BOARD: CXP80624)

Pin No.	Signal	I/O	Function
1	CAP ON	O	Capstan driver ON/OFF control signal. "H" when capstan ON.
2	CAP FWD/RVS	O	Capstan rotating direction control signal. "H": FWD, "L": RVS.
3	RP PB MODE	O	REC/PB select signal of REC/PB amplifier (IC001 on CS-48 board) and ATF servo IC (IC501 on CS-48 board). "H": PB.
4	FE ON	O	Flying erase oscillation ON/OFF control signal. "L": oscillation.
5	JOG VD	O	False VD signal to be inserted into playback video signal during variable speed playback.
6	JOG	O	Variable speed/normal speed playback select signal of video circuit. "H" when variable speed playback.
7	JACK IN/OUT DET	I	Fixed to "H".
8		I	Not used. Fixed to "L".
9		I	
10	INT VD	O	Internal VD signal
11	PB V (SYSTEM SYNC)	O	V sync for mode controller.
12	SYNC DET OUT	O	Sync detect output. "L" when Sync is detected.
13		I	Not used. Fixed to "L".
14		I	Fixed to "H".
15	M SW 0	I	Mode switch input.
16	M SW 1	I	
17	M SW 2	I	
18	CC DOWN	I	Cassette compartment down switch input. "L": down.
19	REC PROOF	I	Erasure protection switch input. "L" when REC prohibit.
20	ME/MP	I	ME/MP switch input. "L": MP, "H": ME.
21	HG/NOR	I	Connected to GND.
22	VIDEO MUTE	O	Video output mute signal. "H": mute.
23			Not used.
24			
25			
26			
27			
28	CAM/LINE	O	Camera input/line input select signal. "H" when camera input.
29	DS ON	O	Data screen ON/OFF signal. "H": ON.
30	EDIT	O	Video circuit EDIT/NORMAL switch signal. "L": EDIT.
31	UNLOAD	O	Loading motor control signal. "H" or "H" pulse when unloading.
32	LOAD	O	Loading motor control signal. "H" or "H" pulse when loading.
33	LM LIM COM	O	Loading motor limiter control signal. Temporary "H" when loading.
34			Not used.
35	DRUM REV	O	Drum rotating control signal. Normally "L".
36		O	N.C.
37		O	
38			Not used.
39	MP		Connected to GND.
40	RESET	I	Reset signal from mode control microprocessor. "L" when reset.
41	VSS		GND
42	XTAL	I	11.89 MHz clock oscillation circuit.
43	EXTAL	O	

	BL	END	EJECT	USE	LOAD	READY	TURN	REC/PB	FF
M SW 0	H	L	L	H	L	H	H	L	L
M SW 1	H	H	L	L	L	L	H	H	L
M SW 2	H	H	H	H	H	L	L	L	L

Pin No.	Signal	I/O	Function
44	COSMO CS	I	Chip select signal from mode control microprocessor (CS-48 board IC506)
45	DATA TO SLVE	I	Serial data input from mode control microprocessor.
46	DATA TO MSTR	O	Serial data output to mode control microprocessor.
47	SCK	I	Serial clock input from mode control microprocessor.
48	AUDIO MUTE	O	Audio output mute signal. "H": mute.
49			Not used.
50	GND	I	GND
51	GND	I	
52	AVSS		Analog port GND.
53	AVREF		Analog port reference voltage. Connected to +5V.
54	VDD		Analog port power supply (5V).
55	N.C.		Connected to GND.
56	END SENS	I	Tape end detection signal. Normally "L", "H" pulse: tape end.
57	TOP SENS	I	Tape top detection signal. Normally "L", "H" pulse: tape top.
58	DEW	I	Dew condensation detection signal. "L" when dew condensation.
59	BATT SENSE	I	Battery voltage input for battery end detection. 1/2 divided by R650 and R651.
60	ATF ERROR	I	ATF error, ATF lock error input.
61	S REEL FG	I	S reel FG signal input.
62	T REEL FG	I	T reel FG signal input.
63	PG7 (N.C.)		Connected to GND.
64	CAM VD	I	VD signal from camera circuit sync generator. V period pulse.
65	FLD	I	FIELD signal from camera circuit sync generator. 2V period pulse.
66	VTR SYNC	I	Composite sync signal separated from REC/PB Y signal.
67	PB SP LP	I	Discriminates PB tape REC mode when CUE/REVIEW/FF and REW. "L": LP.
68	DRUM PG	I	Drum PG signal input. For drum phase servo 33.3 msec period "H" pulse.
69	DRUM FG	I	Drum FG signal input. For drum speed servo 2.8 msec period pulse.
70	CAP FG	I	Capstan FG signal input. For capstan speed servo. Approx. 994 Hz when REC/PB (SP).
71	N.C.	O	N.C.
72	T/E LED ON	O	Tape LED ON/OFF signal. 100 msec period "H" pulse when REC/PB.
73	N.C.	O	N.C.
74	N.C.	O	
75	CAP PWM	O	Capstan error signal output 20.15 μ sec PWM signal.
76	DRUM PWM	O	Drum error signal output 20.15 μ sec PWM signal.
77	C FG	I	Capstan FG signal input. For tape counter.
78			Not used, connected to +5V.
79	LANC IN	I	Control L serial data input.
80	LANC OUT	O	Control L serial data output.
81	LIMIT CONT (I)	I	Loading motor limiter ON detection signal. Normally "H", "L" when limiter ON.
82	AGC SLOW		Not used.
83	DRUM ON	O	Drum driver ON/OFF control signal. "H" when drum ON.
84	CLOG	O	Head clog detection signal. "L" when no trouble.
85	REF PILOT	O	ATF servo reference pilot signal. Synchronized when drum rotation to output by selecting four frequencies. f1=102.52 kHz, f2=118.95 kHz, f3=165.21 kHz and f4=148.69 kHz.

Pin No.	Signal	I/O	Function
86			Connected to +5V.
87	I3/I0 SW	I	Connected to GND.
88	VSS		GND
89	VDD		VDD
90	(VPP)		Connected to +5V.
91			Not used.
92	DRUM BRK	O	Drum motor brake signal. Normally "L".
93	SP/LP	O	SP/LP select signal. "L": LP.
94			N.C.
95	O SW	O	VIDEO OUT inhibit signal. "H": inhibit.
96	I SW	O	VIDEO IN/OUT select signal. "L": VIDEO IN.
97	VA PB MODE	O	Video/audio circuit REC/PB select signal. "H": PB.
98	VI SWP	O	RF switching pulse signal for video circuit. 30 Hz, 50% duty pulse.
99	RF SWP	O	RF switching pulse signal for REC/PB amp and Audio circuit. 30 Hz, 50% duty pulse.
100		O	Not used.

6-3. MODE CONTROL MICROPROCESSOR PIN FUNCTION (IC506 ON CS-48 BOARD: μ PD75316)

Pin No.	Signal	I/O	Function
1			Not used.
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			
13	EEPROM CS	O	Chip select signal to EEPROM (IC511 on CS-48 board). 1/2V period "L" pulse.
14	TG STBY I	O	Power save control signal to timing generator (IC801 on CS-48 board). Normally "L".
15	AUDIO IN/OUT	O	Audio input/output control signal. "H": input. "L": output.
16		O	N.C.
17			Not used.
18	REMO CS	O	Chip select signal to sircs remote controller (IC509 on CS-48 board). 1V period "L" pulse.
19			Not used.
20	CAM COSM CS	O	Chip select signal to camera controller (IC709 on CS-48 board). 1V period "L" pulse.
21			Not used.
22			
23			
24			
25			
26			
27			
28			
29	K OUT 4	O	KEY matrix output. 1V period "L" pulse output when corresponding key is pressed. "L" when other cases.
30	K OUT 5	O	
31	SYS RESET	O	Output signal to reset each IC when power is turned on. Normally "H".
32	TALLY	O	Tally LED ON/OFF signal. "L": ON.
33	VSS		GND
34	K OUT 0	O	KEY matrix output. 1V period "L" pulse output when corresponding key is pressed. "L" when other cases.
35	K OUT 1	O	
36	K OUT 2	O	
37	K OUT 3	O	
38	BATT IN	I	Clock select to 32 kHz when "L" and to 4.19 MHz with "H" when Battery is turned on. "L" is select.
39	SCK	O	Serial clock output terminal, Serial clock (2 μ S) communication.
40	DATA TO SLVE	O	Serial bus output terminal, Serial clock (2 μ S) communication.
41	DATA TO MSTR	I	Serial bus input terminal, Serial clock (2 μ S) communication.

Pin No.	Signal	I/O	Function
42	SYSTEM SYNC	I	(Edge detection vector interruption), System synchronization input port from CXP80624 (IC503 on CS-48 board).
43	LI PRE END	I	(Edge detection vector interruption), Lithium PRE END is selected with "L".
44	LANC PWR ON	I	Power on signal input from wired remote control. "L" when power switch pressed.
45			Not used.
46	VTR ON	O	VTR power source (SS5V, VIDEO 5V, AUDIO 5V, EVF 5V, D5V, D4V) control signal. "H" when power switch is in "VTR" or "CAMERA" position.
47	CAM ON	O	CAMERA power source (CAM 5V, +15V, -9V) control signal. "H" when power switch is in "CAMERA" position.
48	VIDEO D/A CS	O	Serial data load signal to video circuit EVR (IC203, 204 on VA-88 board). 1V period "H" pulse.
49			Not used.
50	VIDEO CS	O	Chip select signal to Y process IC (IC201 on VA-88 board). 1V period "L" pulse.
51	VTR COSM CS	O	Chip select signal to mechanism controller (IC503 on CS-48 board). 1V period "L" pulse.
52	SG CS	O	Chip select signal to sync generator (IC704 on CS-48 board). 1V period "L" pulse.
53	CRTC CS	O	Strobe signal for character generator (IC703 on CS-48 board). 1V period "H" pulse.
54	VDD		VDD
55	XT1	I	SUB system clock. 32 kHz oscillation terminal.
56	XT2		
57	N.C.		Connected to +5V.
58	X1	I	Main system clock. 4.19 MHz oscillation terminal.
59	X2	I	
60	K IN 0	I	KEY matrix input. 1V period "L" pulse input when corresponding key is pressed. "H" when other case.
61	K IN 1	I	
62	K IN 2	I	
63	K IN 3	I	
64	K IN 4	I	
65	K IN 5	I	
66	K IN 6	I	
67	CC DOWN	I	Cassette compartment lock switch input. "L": Lock.
68	RESET	I	System reset input. "L": Reset, Normally: "H".
69	CLK CHK	O	Clock (32 kHz) output terminal for check.
70			Not used.
71			
72			
73			
74			
75			
76			
77			
78			
79			
80			

SECTION 7 ADJUSTMENTS

7-1. CAMERA SECTION ADJUSTMENTS

When performing adjustments, refer to the layout diagrams for adjustment related parts beginning from page 7-34, 35.

1-1. PREPARATIONS BEFORE ADJUSTMENT (CAMERA SECTION)

1-1-1. List of Service Tools

- Oscilloscope
- Stabilized power supply
- Vectorscope
- Adjusting driver
- Color monitor
- Digital voltmeter

Ref. No.	Name	Part Code	Usage
J-1	Filter for color temperature correction (C14)	J-6080-058-A	Auto white balance adjustment/check White balance adjustment/check
J-2	ND filter 1.0	J-6080-808-A	Max gain adjustment (2 used) White balance check
	ND filter 0.4	J-6080-806-A	Max gain adjustment
	ND filter 0.3	J-6080-818-A	White balance adjustment
	ND filter 0.1	J-6080-807-A	Max gain adjustment
J-3	Pattern box PTB-500	J-6029-140-A	
J-4	Color chart for pattern box	J-6020-250-A	
J-5	Adjusting remote control unit (RM-95-remodeled in part) ^{Note 1}	J-6082-053-A	
J-6	Siemens star	J-6080-875-A	Flange back check
J-7	Measuring pin for camera section	J-6082-139-A	For the camera section adjustment
J-8	Extension cord (30P, 0.8 mm)	J-6082-167-A	For extension of CS-48 board (For the mecha deck check)
J-9	Extension cord (40P, 0.8 mm)	J-6082-168-A	For extension of VA-88 board (For the video section adjustment)
	Extension cord (20P, 0.8 mm)	J-6082-169-A	For extension of VA-88 board (For the video section adjustment)
	Extension cord (18P, 0.8 mm)	J-6082-170-A	For extension of CD-128 board (For the repair of the camera section)
J-10	Extension cord (21P, 0.5 mm)	J-6082-171-A	For extension of lens block (For the repair of the camera section)
J-11	Extension cord (15P, 0.8 mm)	J-6082-172-A	For extension of cabinet L (PJ-65, VK-37 boards) (For the video section adjustment)
	Extension cord (8P, 0.8 mm)	J-6082-173-A	For extension of cabinet L (PJ-65, VK-37 boards) (For the video section adjustment)

Note: If the micro processor IC in the adjusting remote control unit is not the new micro processor (UPD7503G-C56-12), the switchover of the page cannot be carried out. In this case, replace with the new micro processor (8-759-148-35).

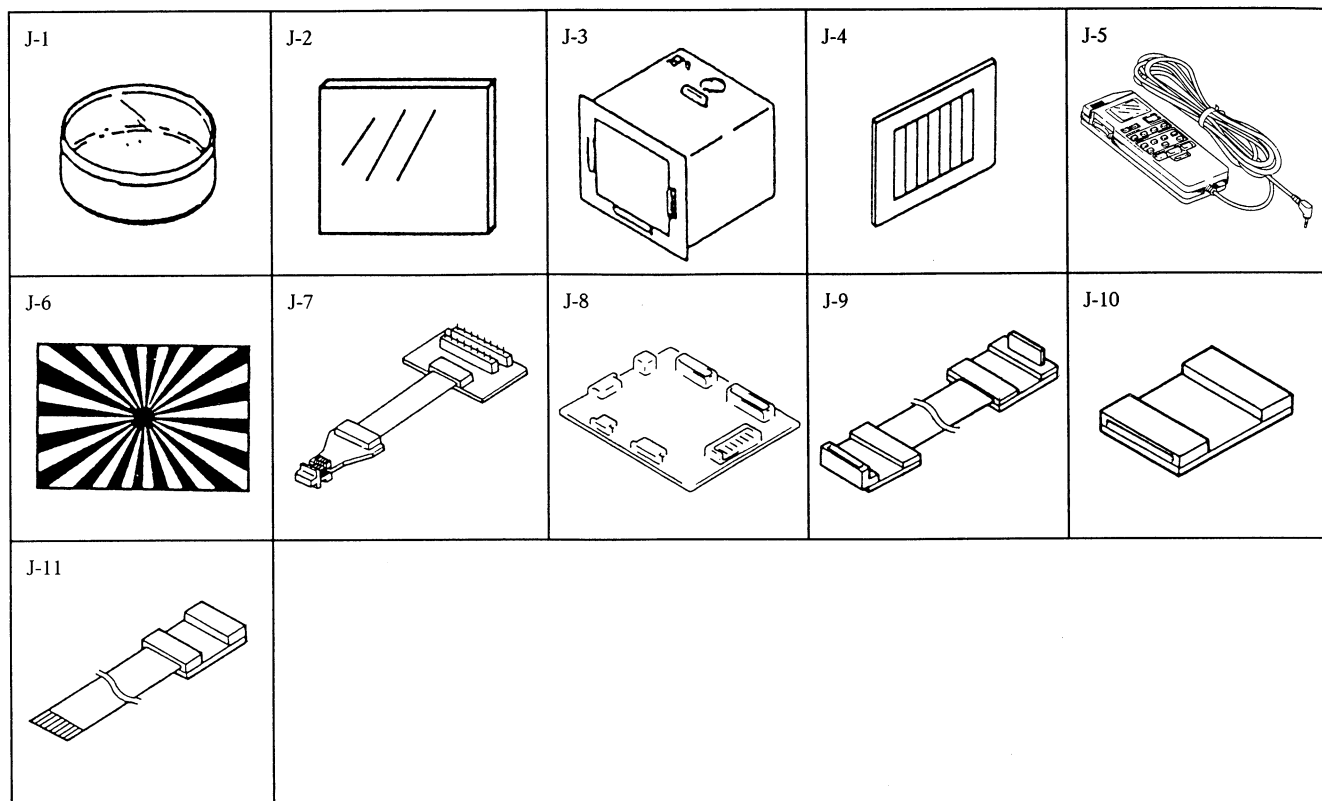


Fig. 7-1-1.

1-1-2. Preparations

Note: For further details on how to remove the cabinet and each board, refer to "2. Disassembly".

- 1) Connect the equipments for adjustment as shown in Fig. 7-1-3.

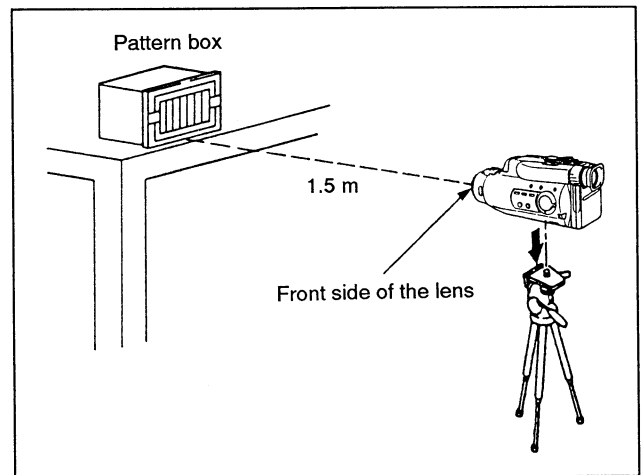


Fig. 7-1-2.

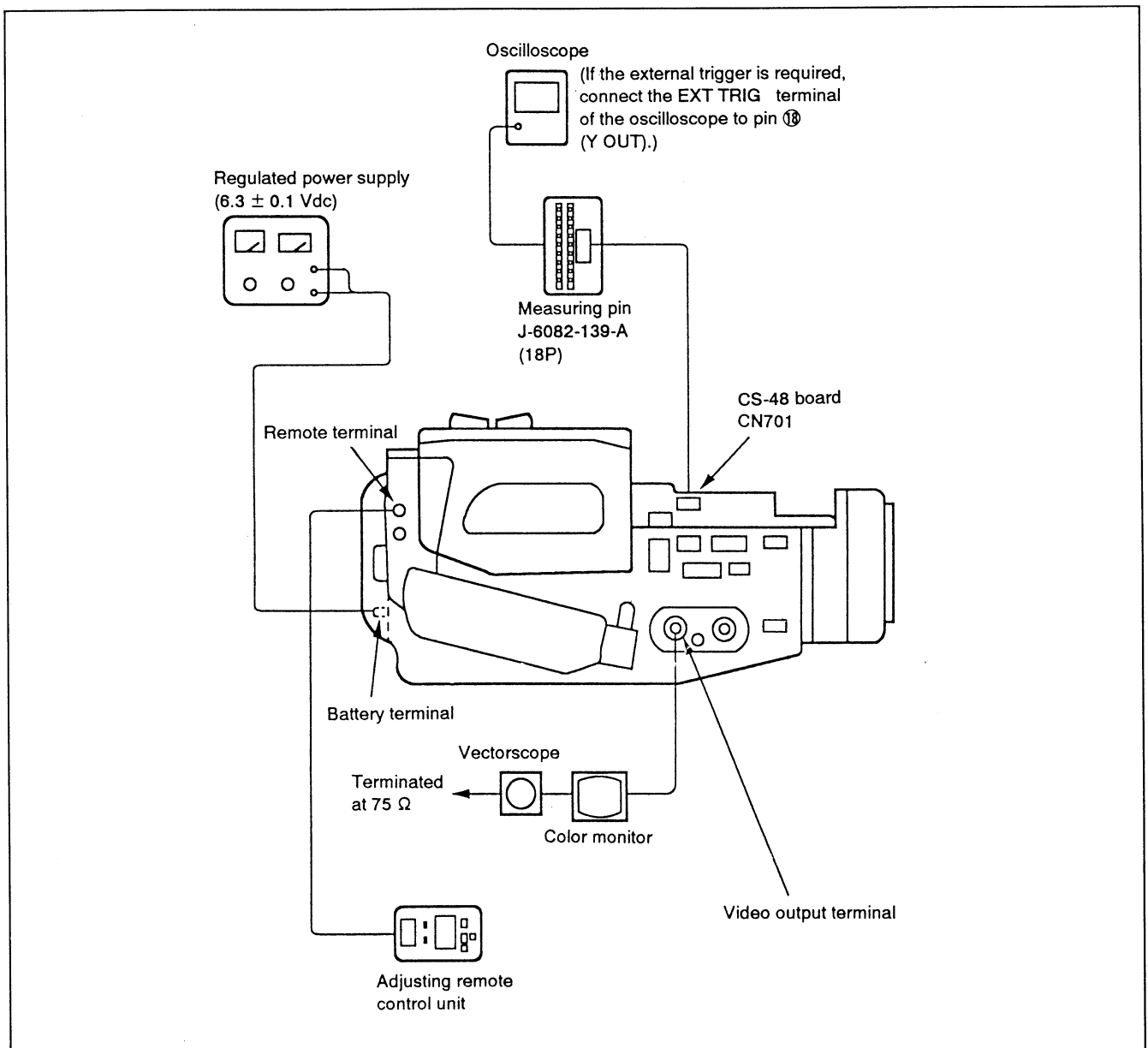


Fig. 7-1-3.

1-1-3. Precautions

1. Switch settings

Set the switches to the following positions, and perform the adjustments without inserting the tape, unless specified otherwise.

1. Camera/player power switch (PK-65 board S560) Camera
2. Standby switch (SW-247 board S581) Standby
3. Back light button (CK-65 board S568) Off

2. Adjustment Procedure

Perform in the given order as a rule.

3. Subject

- 1) Color bar chart (Standard picture frame)
Adjust the display frame as shown in Fig. 7-1-4. if adjustments are performed using the color bar chart. (Standard picture frame)
- 2) White pattern (Standard picture frame)
Remove the color bar chart from the pattern box, and so that the white pattern will be displayed.
Don't touch the zoom switch.

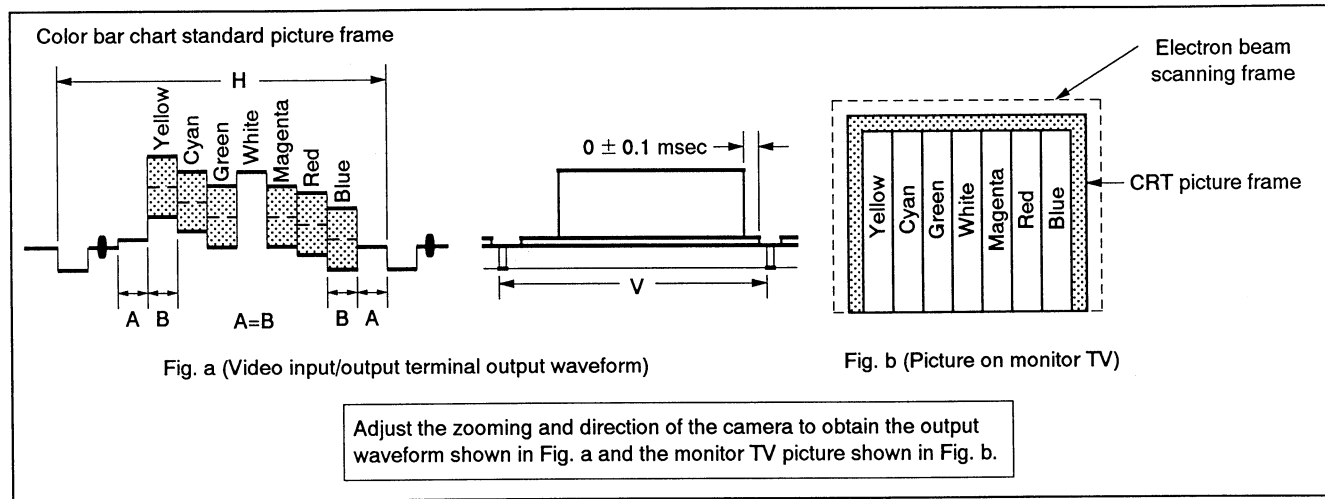


Fig. 7-1-4.

3) Chart for flange back adjustment

Combine a white A0 size (1189 mm× 841 mm) paper to a black one, and make the chart shown in Fig. 7-1-5.

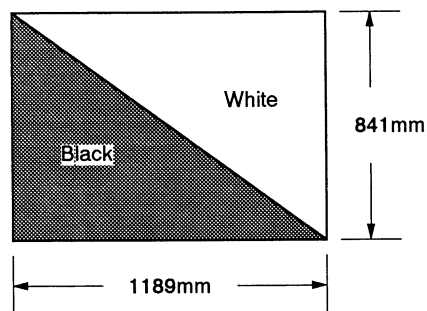


Fig. 7-1-5.

Note: Use the non-reflecting and non-glazing vellum paper whose size is more than A0, and make the boundary between white and black to be smoothly flat.

1-1-4. Adjusting Remote Control Unit

The camera section is adjusted by changing the constant using the coefficient of the digital signal processing calculation, or modifying the output voltage of EVR IC (CS-48 board IC702). These processes are carried out by the camera micro processor (CS-48 board IC709). This micro processor reads the data written in the non-volatile memory (CS-48 board IC712), and transmits it to the digital signal processing circuit and EVR.

The adjusting remote control unit is used for rewriting the adjustment data written in the non-volatile memory necessary for performing the adjustments.

The adjusting remote control unit uses the remote control signal line (LANC) to correspond mutually with the camera micro processor. The page, address and the up/down command of the data can be transmitted from the remote control unit to the camera micro processor. On the other hand, the page, address, and data can also be transmitted the other way round.

1. Using the adjusting remote control unit

- 1) Connect the adjusting remote control unit to the remote terminal (PS-334 board J951).
- 2) Adjust the HOLD switch of the adjusting remote control unit to HOLD (SERVICE position).

If it has been properly connected, the LCD on the adjusting remote control unit will show the display in Fig. 7-1-6.

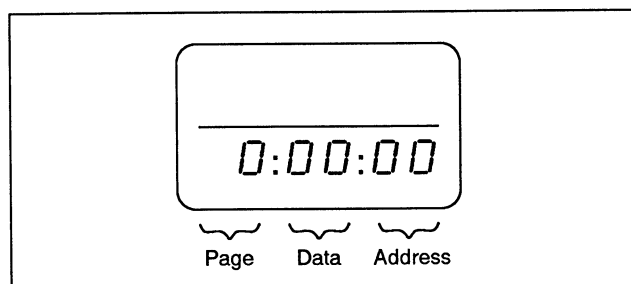


Fig. 7-1-6.

- 3) Operate the adjusting remote control unit as follows.

- Changing the page

The page will increase when the EDIT SEARCH+ button is pressed. It will decrease when the EDIT SEARCH- button is pressed. There are altogether 16 pages, from 0 to F.

Hexadecimal notation	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
Display on LCD	0	1	2	3	4	5	6	7	8	9	A	b	c	d	E	F
Decimal notation conversion value	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15

Table 7-1-1.

- Changing the address

The address will increase when the FF (▶▶) button is pressed, and decrease when the REW (◀◀) button is pressed. There are altogether 256 addresses, from 00 to FF. However, the addresses which are not used for the adjustments will not be displayed.

- Changing the data (Data setting)

The data will increase when the PLAY (▶) button is pressed, and decrease when the STOP (■) button is pressed.

There are altogether 256 data, from 00 to FF.

- Writing the adjustment data

It is necessary to press the PAUSE button to write the adjustment data (F page, D page) in the non-volatile memory.

(The new adjustment data will not be recorded in the non-volatile memory if this operation is not performed.)

- 4) Select page: 6, address: 00, and adjust the data to 01. This releases the write protect of page F, and the camera section (F page) can be adjusted.
- 5) After completing all adjustments, turn off the main power (6.3V) once. This can release the adjustment mode (other than page F).

2. Precautions upon using the adjusting remote control unit

The correct adjustment data may be erased at times, due to operation errors of the adjusting remote control unit. To prevent this from occurring, it is recommended that all adjustment data be recorded in the memory before beginning adjustments, and the new adjustment data be recorded in the memory after each adjustment.

1-1-5. Page F Address List

Note 1: The data listed in the adjustment data memo column are fixed values.

Note 2: The adjustment data initial values are the values after performing “Page F Data Initialization” and “Page F Data Modification”. They are different from the value after performing all the adjustments.

Note 3: The < > is camera micro processor version 5, refer “Page F Data Modification” for how to distinguish the versions.

Address	Adjustment data	
	Initial value	Memo column
00	00	6E
01	E0	E0
02	10	10
03	35	
04	80	
05	80	
06	7B	
07	99	
08	47	
09	71	
0A	30	30
0B	68	68
0C	72	
0D	04	04
0E	16	16
0F	A5	A5
10	3D	3D
11	A8	A8
12	27	27
13	6C	6C
14	2C	2C
15 Note 3	07 <08>	07 <08>
16 Note 3	06 <08>	06 <08>
17	17	17
18	13	
19	11	
1A	FF	
1B	FD	
1C	22	22
1D	00	00
1E	00	00

Table 7-1-2 (1).

Address	Adjustment data	
	Initial value	Memo column
1F	00	
20	00	
21	00	
22	00	
23	00	
24	00	
25	00	
26	00	
27	00	
28	00	
29	00	
2A	00	
2B	00	
2C	00	
2D	72	
2E	5F	
2F	D4	
30	63	
31	3B	
32	2C	
33	42	
34	4A	
35	7E	
36	96	
37	A8	A8
38	A0	A0
39	79	
3A	7F	
3B	02	02
3C	03	03
3D	00	
3E	00	
3F	00	00
40	0A	0A
41	48	48
42	78	78
43	60	60
44	40	40
45	66	66
46	18	18

Table 7-1-2 (2).

Address	Adjustment data	
	Initial value	Memo column
97	18	18
98	04	04
99	13	13
9A	12	12
9B	0A	0A
9C	80	80
9D	0A	0A
9E	C9	C9
9F	0A	0A
A0	00	00
A1 Note 3	00 <72>	00 <72>
A2	D2	D2
A3	03	03
A4	10	10
A5	10	10
A6	80	80
A7 Note 3	B0 <D8>	B0 <D8>
A8	02	02
A9	02	02
AA	05	05
AB	00	00
AC	00	00
AD	00	00
AE Note 3	24 <20>	24 <20>
AF	00	00
B0	12	12
B1	3F	3F
B2		
B3		
B4	00	00
B5	95	95
B6		
B7		
B8		
B9		
BA Note 3	00 <04>	00 <04>
BB Note 3	BB <02>	BB <02>
BC		
BD		
BE	06	06

Table 7-1-2 (5).

Address	Adjustment data	
	Initial value	Memo column
BF	07	07
C0	7D	7D
C1	2C	2C
C2	40	40
C3	18	18
C4	41	41
C5 Note 3	10 <30>	10 <30>
C6	10	10
C7	20	20
C8-EF		
F0	FF	
F1	FF	
F2	FF	
F3	FF	
F4	FF	
F5	FF	
F6	FF	
F7	FF	
F8	FF	
F9	FF	
FA	FF	
FB	FF	
FC	FF	
FD	FF	
FE	FF	
FF	FF	

Table 7-1-2 (6).

1-1-6. Adjustment Connector

Most of the measuring points for the camera section adjustment are concentrated on CN701 of the CS-48 board. Connect the

oscilloscope and etc. via the measuring pin (J-6082-139-A). The following table lists the terminal numbers and the signal names of CN701.

Terminal Number	Signal Name	Terminal Number	Signal Name
1	EVER 5V	2	NC
3	ZOOM SW	4	CAM SI
5	CS ROM	6	CAM SO
7	CS OPD	8	CAM SCK
9	CS CORE	10	GND
11	IRIS OUT	12	NC
13	V SUB CHK	14	C OUT
15	PG CONT	16	GND
17	NC	18	Y OUT

Table 7-1-3.

1-1-7. Data Processing

The calculation of the DDS display and the adjusting remote control unit display data (hexadecimal notation) are required for obtaining the adjustment data of some adjustment items. In this

case, after converting the hexadecimal notation to decimal notation, calculate and convert the result to hexadecimal notation, and use it as the adjustment data. Table 7-1-4. indicates the hexadecimal notation-the decimal notation calculation table.

Hexadecimal notation-Decimal notation

The lower digits of the hexadecimal notation The upper digits of the hexadecimal notation	② ↓ 0 1 2 3 4 5 6 7 8 9 A B C D E F (R) (b) (c) (d) (E) (F)															
	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
2	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47
3	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63
4	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79
5	80	80	82	83	84	85	86	87	88	89	90	91	92	93	94	95
6	96	97	98	99	100	101	102	103	104	105	106	107	108	109	110	111
7	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127
8	128	129	130	131	132	133	134	135	136	137	138	139	140	141	142	143
9	144	145	146	147	148	149	150	151	152	153	154	155	156	157	158	159
A (R)	160	161	162	163	164	165	166	167	168	169	170	171	172	173	174	175
① → B (b)	176	177	178	179	180	180	182	183	184	185	186	187	188	189	190	191
C (c)	192	193	194	195	196	197	198	199	200	201	202	203	204	205	206	207
D (d)	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223
E (E)	224	225	226	227	228	229	230	231	232	233	234	235	236	237	238	239
F (F)	240	241	242	243	244	245	246	247	248	249	250	251	252	253	254	255

Note: () indicate the adjusting remote control unit display.

(Example) In the case that the DDS display and the adjusting remote control unit display are BD (b d).

As the upper digit of the hexadecimal notation is B (b), and the lower digit is D (d), the intersection "189" of the ① and ② in the above table is the decimal notation to be calculated.

Table 7-1-4.

Address	Adjustment data	
	Initial value	Memo column
47	66	66
48	18	18
49	C2	C2
4A Note 3	94 <8C>	94 <8C>
4B	AD	AD
4C	96	96
4D	78	78
4E	60	60
4F Note 3	6C <66>	6C <66>
50 Note 3	5C <59>	5C <59>
51	6E	6E
52	20	20
53	83	83
54	67	67
55	5C	5C
56	5C	5C
57	4A	4A
58	1B	1B
59	06	06
5A Note 3	5B <5E>	5B <5E>
5B	39	39
5C Note 3	10 <0E>	10 <0E>
5D	40	40
5E	0C	0C
5F	06	06
60	00	00
61	00	00
62	1E	1E
63	E3	
64	32	
65	80	80
66	D0	D0
67	00	00
68	00	00
69	40	40
6A	30	30
6B	10	10
6C	FF	FF
6D	13	13
6E	40	40

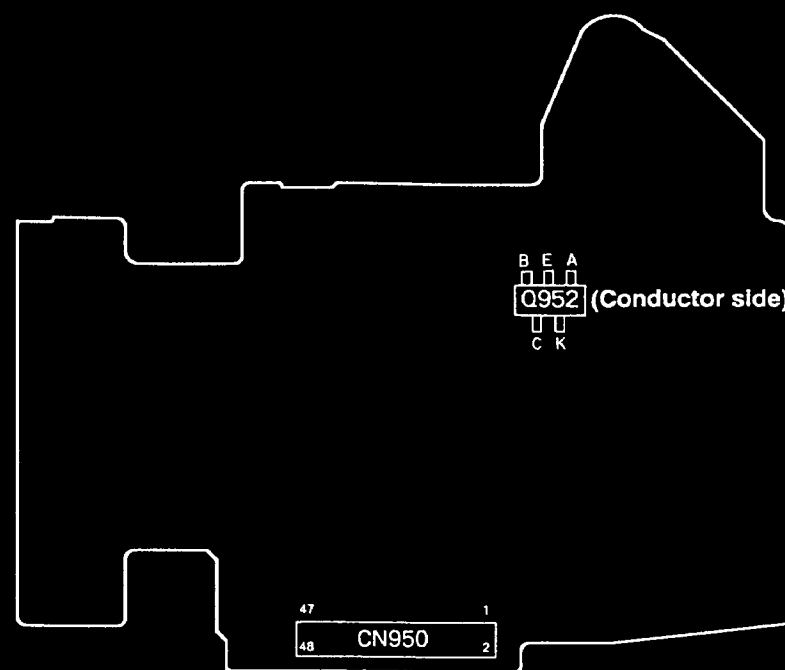
Table 7-1-2 (3).

Address	Adjustment data	
	Initial value	Memo column
6F	03	03
70	01	01
71	60	60
72	20	20
73	E0	E0
74	90	90
75	08	08
76	40	40
77	90	90
78	C0	C0
79	B0	B0
7A	A0	A0
7B	70	70
7C	80	80
7D	A0	A0
7E	98	98
7F	90	90
80	78	78
81	80	80
82	02	02
83	04	04
84	0F	0F
85	4F	4F
86	00	
87	00	
88	00	
89	04	
8A Note 3	80 <60>	
8B	00	00
8C	18	18
8D Note 3	82 <7D>	82 <7D>
8E Note 3	AB <7D>	AB <7D>
8F	C9	C9
90	3D	3D
91	12	12
92	02	02
93	05	05
94 Note 3	0B <07>	0B <07>
95	20	20
96	1A	1A

Table 7-1-2 (4).

1-6. ARRANGEMENT DIAGRAM FOR ADJUSTMENT PARTS

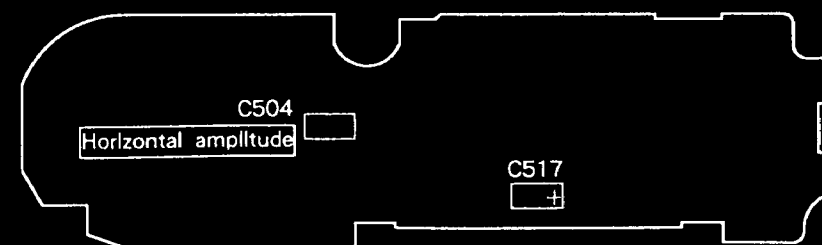
PS-334 BOARD (COMPONENT SIDE)



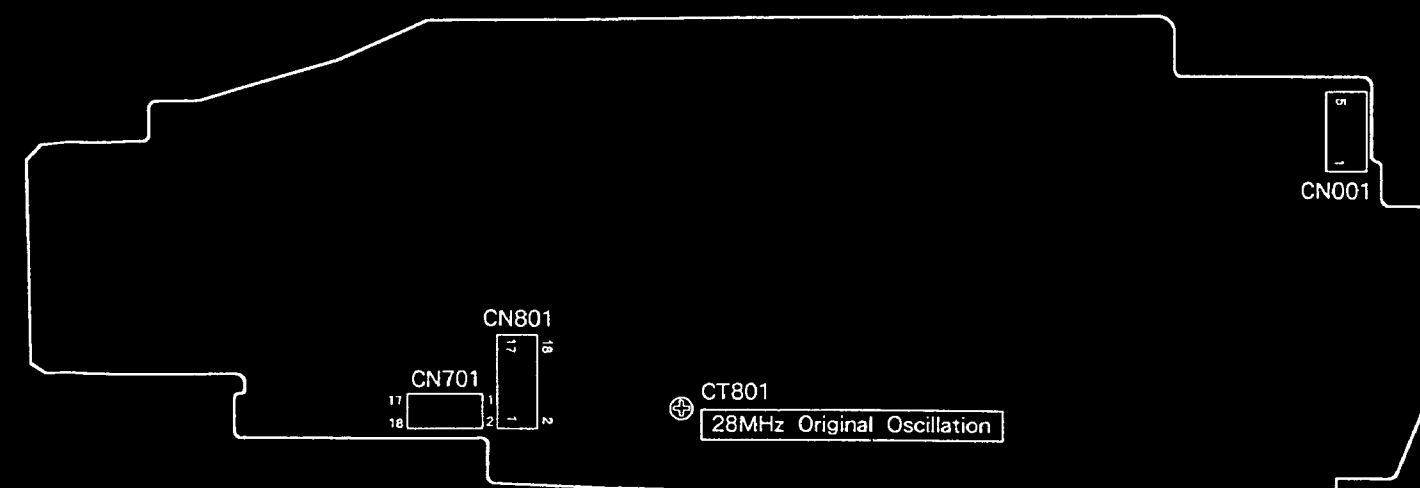
VF-44 BOARD (COMPONENT SIDE)



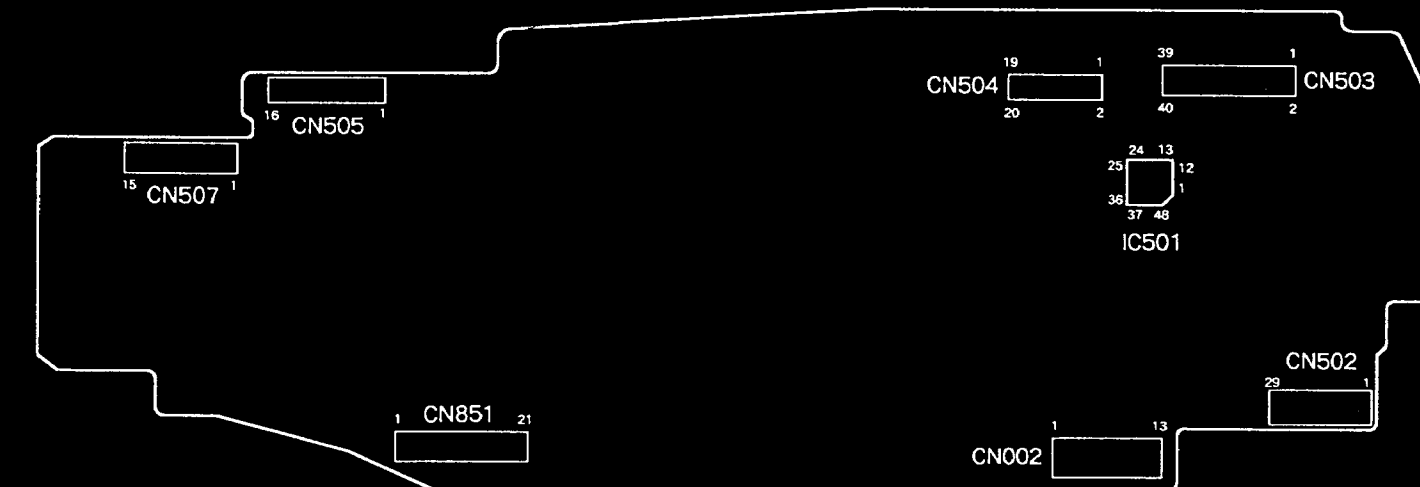
VF-44 BOARD (CONDUCTOR SIDE)



CS-48 BOARD (COMPONENT SIDE)



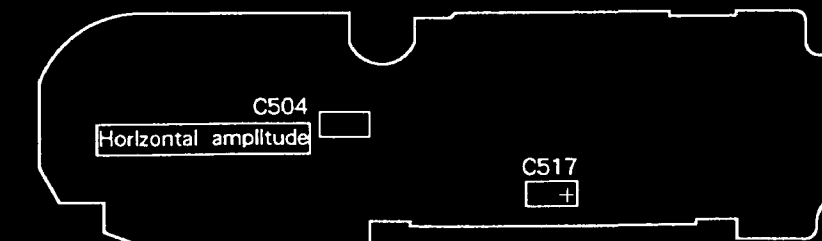
CS-48 BOARD (CONDUCTOR SIDE)



VF-51 BOARD (COMPONENT SIDE)



VF-51 BOARD (CONDUCTOR SIDE)



4. IR Adjustment (VA-88 board)

Set the characteristics of filter.
If is not correct, distortion and noises will stand out.

Mode	Playback
Signal	Alignment tape: For checking operations (WR5-5NSP)
Measurement Point	+: Pin ⑥ of IC401 -: Pin ④ of IC401 (C428 ⊕)
Measuring Instrument	Digital voltmeter
Adjustment Page	D
Adjustment Address	7A (1.5 IR)
Specified Value	The DC voltage difference between pins ④ and ⑥ is 0 ± 10 mVdc

- Adjusting method:
- Release the protect.
Page: 1, address: 00, data: 01
 - Change the data of page: D, address: 7A and adjust so that the DC voltage becomes 0 ± 10 mVdc.
 - Press the PAUSE button of the adjusting remote control unit.

5. Deviation Adjustment

Adjusts the 1.5 MHz AFM signal deviation.
If improper, the playback level will differ from that of other unit.

Mode	Playback
Signal	Alignment tape: For checking the operation (WR5-5NSP)
Measurement Point	Audio output terminal
Measuring Instrument	Oscilloscope
Adjustment Page	D
Adjustment Address	7B (1.5 DEV)
Specified Value	-7.5 ± 1.0 dBs

- Adjusting method:
- Release the protect.
Page: 1, address: 00, data: 01
 - Change the data of page: D, address: 7B, and adjust so that the 400 Hz signal level becomes the specified value.
 - Press the PAUSE button of the adjusting remote control unit.

6. Overall Level Characteristic, Distortion Check

Mode	Self recording/playback
Signal	400 Hz, -7.5 dBs: Audio input terminal
Measurement Point	Audio output terminal
Measuring Instrument	Audio level meter and distortion meter
Specified Value	Level: -7.5 ± 2.5 dBs Distortion rate: Below 0.5% (Note 1)

Note: 1) Value when the following filter is used

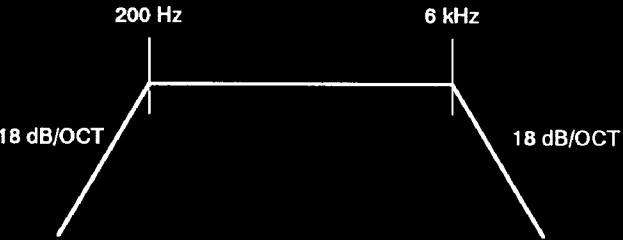


Fig. 7-3-23.

- Checking method:
- Input the 400 Hz, -7.5 dBs signal only to the audio input terminal.
 - Record the signal.
 - Remove the input signal.
 - Playback the recorded section.
 - Check that the 400 Hz signal level of the audio output terminal is -7.5 ± 2.5 dBs, and that the distortion rate is below 0.5% (Note 1).

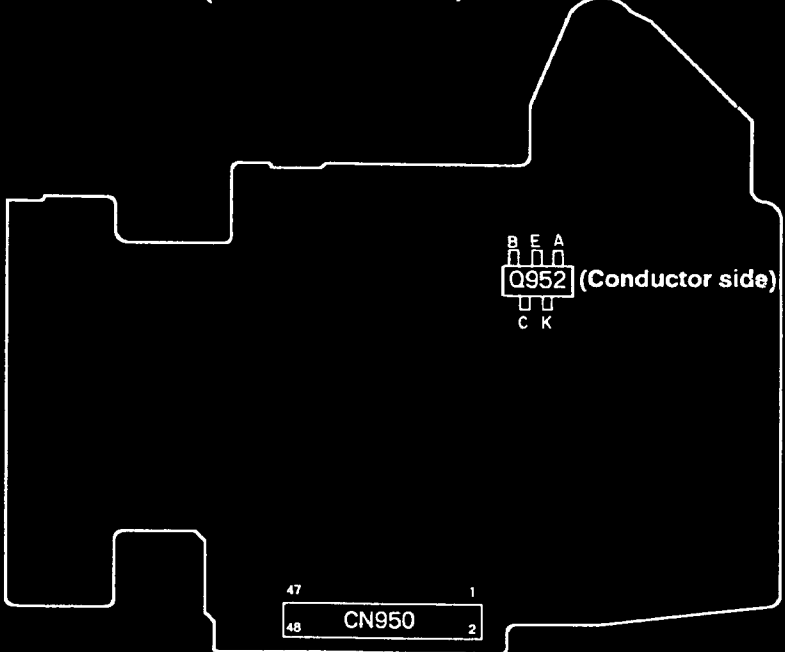
7. Overall Noise Level Check

Mode	Self recording
Signal	No signal: Audio input terminal
Measurement Point	Audio output terminal
Measuring Instrument	Audio level meter (Use an IHF-A curve auditory correction filter)
Specified Value	Below -65.0 dBs

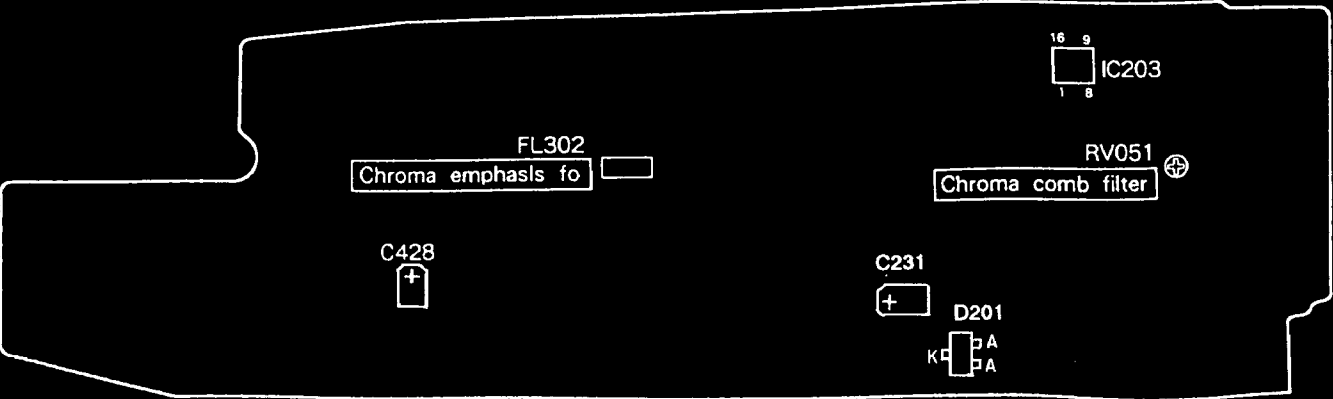
- Checking method:
- Remove the audio input signal.
 - Record.
 - Playback the recorded section.
 - Check that the noise level of the audio output terminal is below -65.0 dBs.

3-7. ARRANGEMENT DIAGRAM FOR ADJUSTMENT PARTS

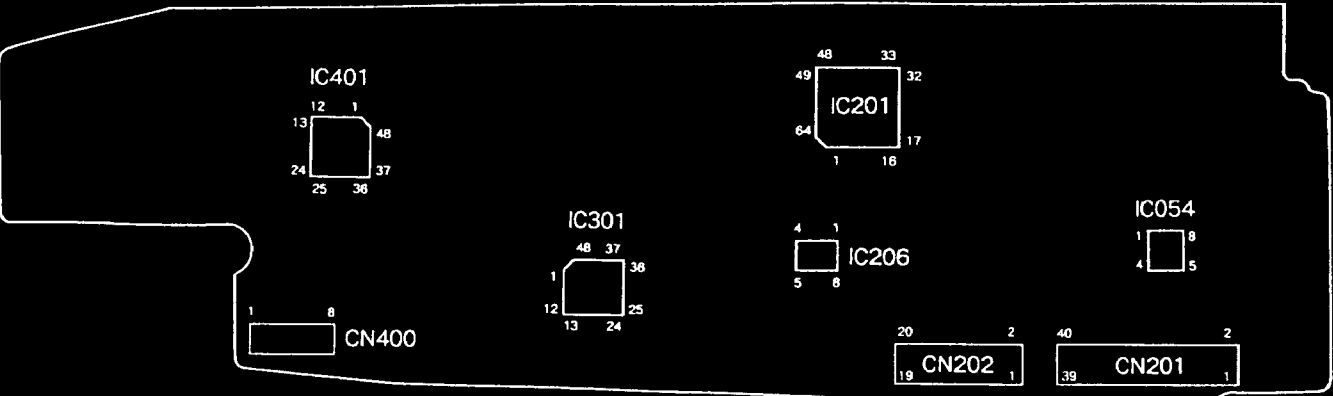
PS-334 BOARD (COMPONENT SIDE)



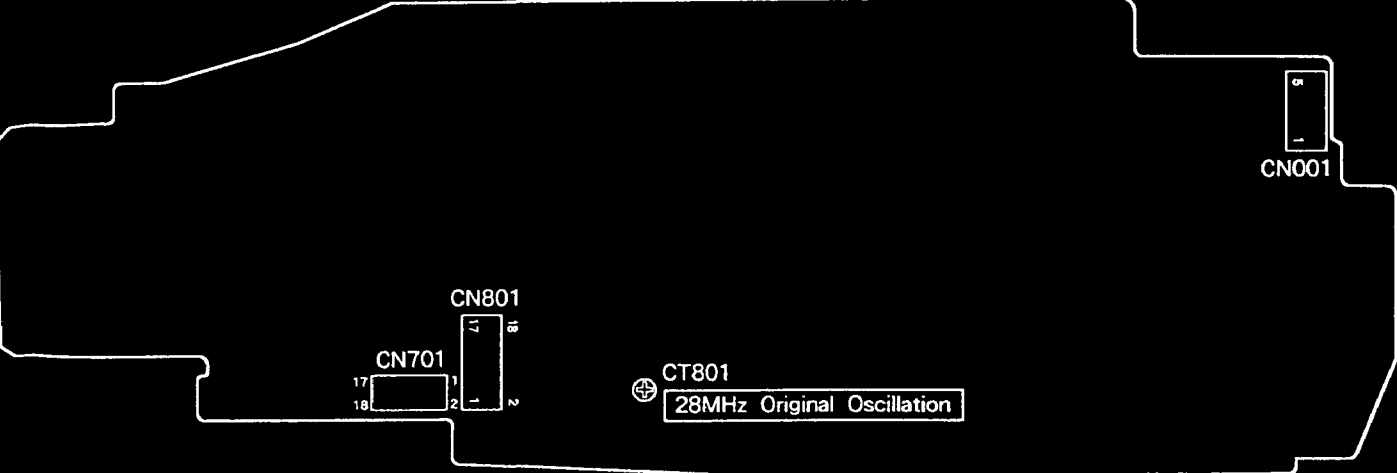
VA-88 BOARD (COMPONENT SIDE)



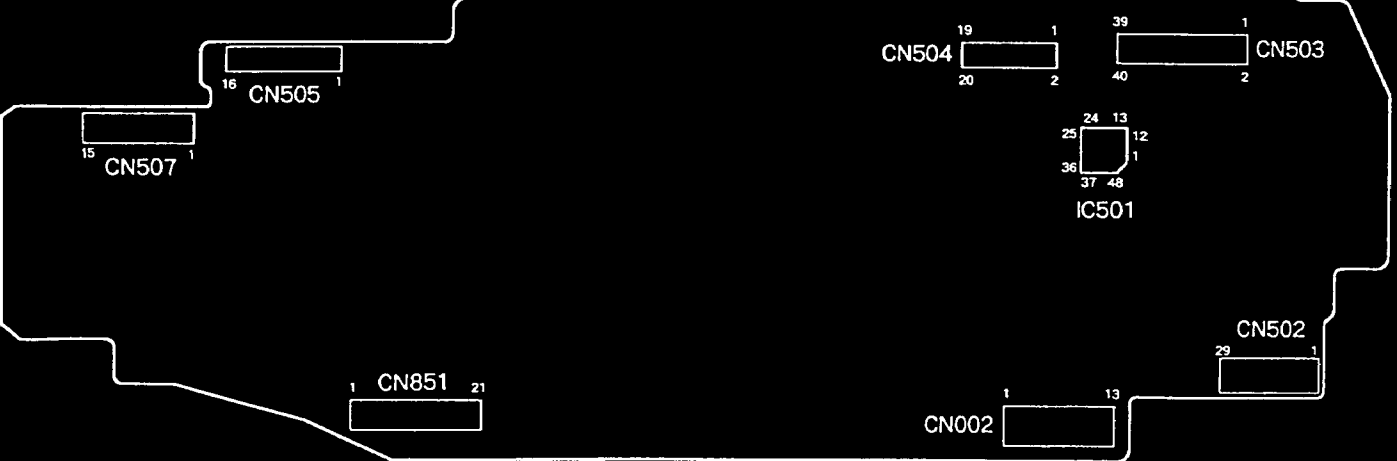
VA-88 BOARD (CONDUCTOR SIDE)



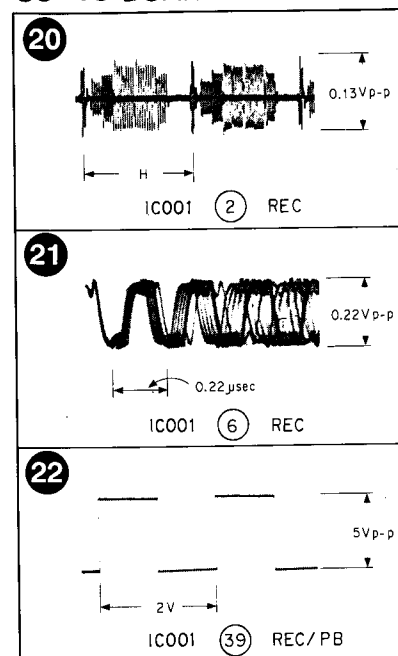
CS-48 BOARD (COMPONENT SIDE)

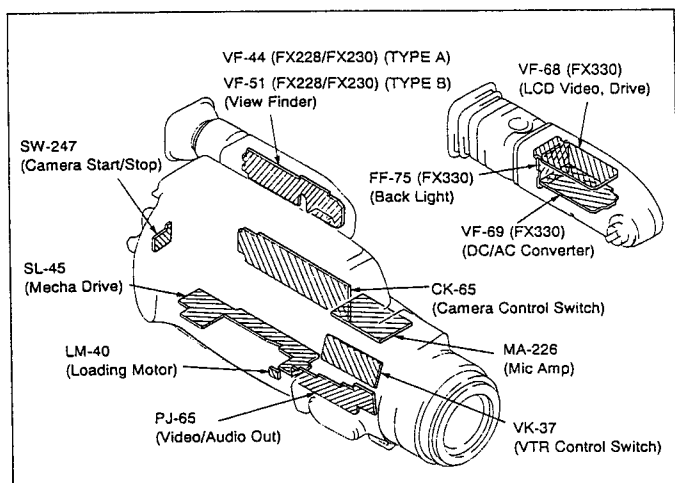


CS-48 BOARD (CONDUCTOR SIDE)

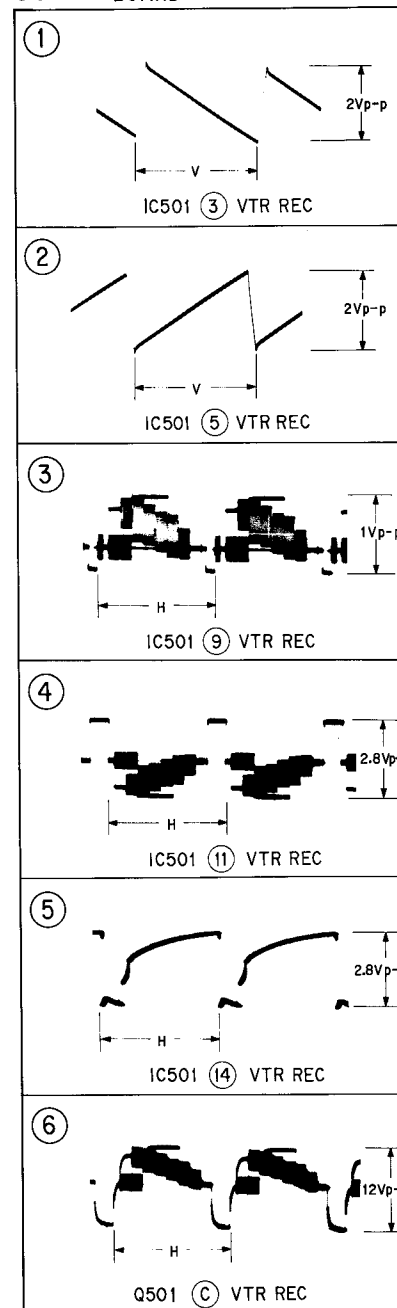


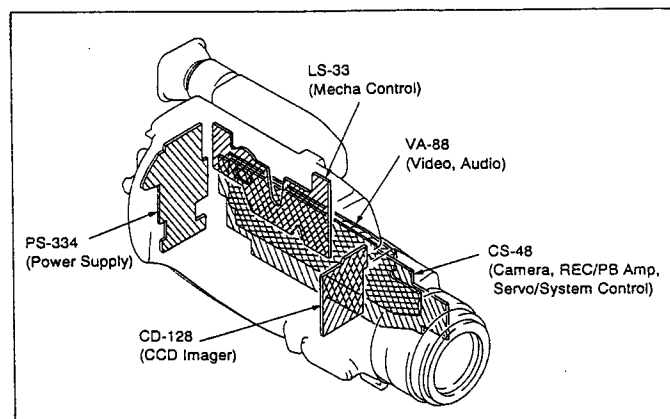
CS-48 BOARD (4/5)



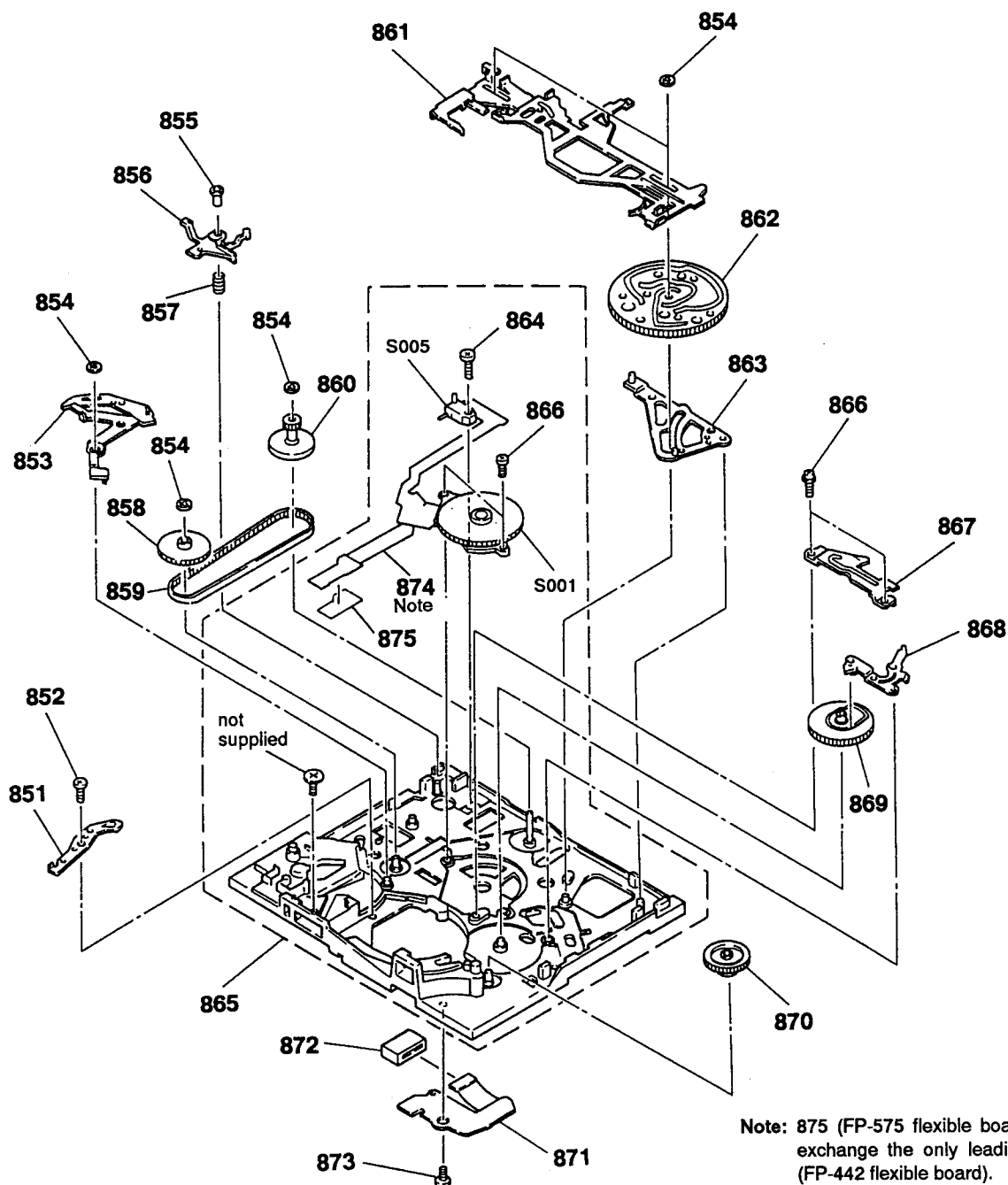


VF-44 BOARD





5-1-10. MECHANISM CHASSIS ASSEMBLY (2)



5-2. ELECTRICAL PARTS LIST

NOTE:

The components identified by mark Δ or dotted line with mark Δ are critical for safety.
Replace only with part number specified.

Les composants identifiés par une marque Δ sont critiques pour la sécurité.
Ne les remplacer que par une pièce portant le numéro spécifié.

When indicating parts by reference number, please include the board name.

- Due to standardization, replacements in the parts list may be different from the parts specified in the diagrams or the components used on the set.
- -XX, -X mean standardized parts, so they may have some difference from the original one.
- Items marked "*" are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.
- Hardware (# mark) list is given in the last of this parts list.

- RESISTORS
All resistors are in ohms
METAL: Metal-film resistor
METAL OXIDE: Metal Oxide-film resistor
F: nonflammable
- SEMICONDUCTORS
In each case, u: μ , for example:
uA...: μ A..., uPA...: μ PA..., uPB...: μ PB...,
uPC...: μ PC..., uPD...: μ PD...
- CAPACITORS
uF: μ F
- COILS
uH: μ H

Ref.No.	Part No.	Description	Remark	Ref.No.	Part No.	Description	Remark
*	A-7066-162-A	CD-128 BOARD, COMPLETE ***** (Ref.No. 3,000 Series)		R906	1-216-819-11	METAL CHIP 680 5% 1/16W	
		< CAPACITOR >		R907	1-216-835-11	METAL CHIP 15K 5% 1/16W	
C901	1-135-214-21	TANTAL. CHIP 4.7uF 20% 20V		R908	1-216-850-11	METAL CHIP 270K 5% 1/16W	
C902	1-128-013-11	ELECT CHIP 1uF 20% 50V		R909	1-216-833-11	METAL CHIP 10K 5% 1/16W	
C903	1-128-008-11	ELECT CHIP 3.3uF 20% 35V		R910	1-216-809-11	METAL CHIP 100 5% 1/16W	
C904	1-162-964-11	CERAMIC CHIP 0.001uF 10% 50V		R911	1-216-828-11	METAL CHIP 3.9K 5% 1/16W	
C905	1-162-637-11	CERAMIC CHIP 0.47uF 16V		R913	1-216-864-11	METAL CHIP 0 5% 1/16W	
C906	1-126-607-11	ELECT CHIP 47uF 20% 4V		R914	1-216-821-11	METAL CHIP 1K 5% 1/16W	
C907	1-128-004-11	ELECT CHIP 10uF 20% 16V		R915	1-216-821-11	METAL CHIP 1K 5% 1/16W	
C908	1-128-007-11	ELECT CHIP 2.2uF 20% 35V		R916	1-216-829-11	METAL CHIP 4.7K 5% 1/16W	
C909	1-162-974-11	CERAMIC CHIP 0.01uF 50V		R917	1-216-821-11	METAL CHIP 1K 5% 1/16W	
C910	1-164-156-11	CERAMIC CHIP 0.1uF 25V		R921	1-216-829-11	METAL CHIP 4.7K 5% 1/16W	
C911	1-164-360-11	CERAMIC CHIP 0.1uF 16V		*****			
C912	1-162-974-11	CERAMIC CHIP 0.01uF 50V		*	A-7072-056-A	CK-65 BOARD, COMPLETE (FX228/FX230) *****	
		< CONNECTOR >		*	A-7072-086-A	CK-65 BOARD, COMPLETE (FX330) ***** (Ref.No. 4,000 Series)	
CN901	1-573-372-21	CONNECTOR, BOARD TO BOARD 18P				< CONNECTOR >	
CN902	1-566-537-11	CONNECTOR, FPC (NON ZIP) 5P		* CN562	1-580-756-21	PIN, CONNECTOR 7P (FX228/FX230)	
		< DIODE >		CN563	1-580-789-21	PIN, CONNECTOR (SMD) 6P (FX330)	
D901	8-719-820-05	DIODE 1SS181				< DIODE >	
D903	8-719-820-05	DIODE 1SS181		D530	8-719-802-36	DIODE 1SS250	
D904	8-719-800-76	DIODE 1SS226		D560	8-719-404-46	DIODE MA110	
		< COIL >		D562	8-719-404-46	DIODE MA110	
L901	1-412-032-11	INDUCTOR CHIP 100uH		D563	8-719-110-03	DIODE RD7.5ES-B2	
		< TRANSISTOR >		D567	8-719-110-03	DIODE RD7.5ES-B2	
Q901	8-729-602-21	TRANSISTOR 2SC4154-F		D568	8-719-110-03	DIODE RD7.5ES-B2	
Q902	8-729-402-13	TRANSISTOR XN1501		D573	8-719-110-03	DIODE RD7.5ES-B2	
Q903	8-729-232-86	TRANSISTOR 2SK1875				< COIL >	
		< RESISTOR >		L560	1-412-028-11	INDUCTOR CHIP 4.7uH	
R901	1-216-845-11	METAL CHIP 100K 5% 1/16W				< RESISTOR >	
R902	1-216-857-11	METAL CHIP 1M 5% 1/16W		R561	1-216-296-91	METAL GLAZE 0 5% 1/8W (FX330)	
R903	1-216-839-11	METAL CHIP 33K 5% 1/16W		Be sure to read "Note on the CCD Imager replacement" on page 4-9 when changing the CCD imager.			
R904	1-216-843-11	METAL CHIP 68K 5% 1/16W					
R905	1-216-849-11	METAL CHIP 220K 5% 1/16W					

CK-65**CS-48**

Ref. No.	Part No.	Description	Remark	Ref. No.	Part No.	Description	Remark
< SWITCH >				C044	1-162-927-11	CERAMIC CHIP 100PF 5%	50V
S560	1-692-024-11	SWITCH, ROTARY (POWER CAMERA/OFF/VTR)		C045	1-164-217-11	CERAMIC CHIP 150PF 5%	50V
S564	1-572-938-21	SWITCH, TACTIL (DATE +)		C046	1-164-360-11	CERAMIC CHIP 0.1uF	16V
S565	1-572-938-21	SWITCH, TACTIL (TIME)		C501	1-162-974-11	CERAMIC CHIP 0.01uF	50V
S566	1-572-938-21	SWITCH, TACTIL (COUNTER RESET)		C502	1-162-974-11	CERAMIC CHIP 0.01uF	50V
S567	1-692-111-11	SWITCH, KEY BOARD (TAPE/BATT CHECK)		C503	1-162-995-11	CERAMIC CHIP 0.022uF	50V
S568	1-692-111-11	SWITCH, KEY BOARD (BACK LIGHT)		C504	1-162-995-11	CERAMIC CHIP 0.022uF	50V
< FLAT CABLE >				C505	1-162-964-11	CERAMIC CHIP 0.001uF 10%	50V
W561	1-690-602-11	CABLE, FLAT (FFC-23) 16P		C506	1-162-964-11	CERAMIC CHIP 0.001uF 10%	50V
*****				C507	1-162-995-11	CERAMIC CHIP 0.022uF	50V
*	A-7066-164-A	CS-48 BOARD, COMPLETE		C508	1-162-995-11	CERAMIC CHIP 0.022uF	50V
		*****		C509	1-128-004-11	ELECT CHIP 10uF 20%	16V
		(Ref. No. 1,000 Series)		C510	1-162-995-11	CERAMIC CHIP 0.022uF	50V
	X-3941-498-1	CASE (LID), SHIELD, CAMERA		C511	1-162-974-11	CERAMIC CHIP 0.01uF	50V
*	3-946-178-01	CASE (LID), SHIELD, RP		C512	1-164-173-11	CERAMIC CHIP 0.0039uF 10%	50V
*	3-946-179-01	CASE (MAIN), SHIELD, FE		C513	1-162-964-11	CERAMIC CHIP 0.001uF 10%	50V
*	3-948-499-01	CASE (MAIN), SHIELD, RP		C514	1-162-995-11	CERAMIC CHIP 0.022uF	50V
< CAPACITOR >				C515	1-128-004-11	ELECT CHIP 10uF 20%	16V
C001	1-162-974-11	CERAMIC CHIP 0.01uF	50V	C517	1-128-004-11	ELECT CHIP 10uF 20%	16V
C002	1-162-974-11	CERAMIC CHIP 0.01uF	50V	C518	1-162-995-11	CERAMIC CHIP 0.022uF	50V
C003	1-128-004-11	ELECT CHIP 10uF 20%	16V	C519	1-128-004-11	ELECT CHIP 10uF 20%	16V
C004	1-164-633-11	CERAMIC CHIP 0.1uF 10%	25V	C520	1-164-489-11	CERAMIC CHIP 0.22uF 10%	16V
C005	1-164-360-11	CERAMIC CHIP 0.1uF	16V	C521	1-163-809-11	CERAMIC CHIP 0.047uF 10%	25V
C006	1-164-633-11	CERAMIC CHIP 0.1uF 10%	25V	C522	1-162-970-11	CERAMIC CHIP 0.01uF 10%	25V
C007	1-128-004-11	ELECT CHIP 10uF 20%	16V	C523	1-162-965-11	CERAMIC CHIP 0.0015uF 10%	50V
C008	1-164-633-11	CERAMIC CHIP 0.1uF 10%	25V	C524	1-163-809-11	CERAMIC CHIP 0.047uF 10%	25V
C009	1-164-633-11	CERAMIC CHIP 0.1uF 10%	25V	C525	1-164-227-11	CERAMIC CHIP 0.022uF 10%	25V
C010	1-164-633-11	CERAMIC CHIP 0.1uF 10%	25V	C526	1-162-995-11	CERAMIC CHIP 0.022uF	50V
C011	1-164-633-11	CERAMIC CHIP 0.1uF 10%	25V	C527	1-163-035-00	CERAMIC CHIP 0.047uF	50V
C012	1-162-974-11	CERAMIC CHIP 0.01uF	50V	C528	1-128-006-11	ELECT CHIP 4.7uF 20%	25V
C013	1-162-974-11	CERAMIC CHIP 0.01uF	50V	C529	1-162-974-11	CERAMIC CHIP 0.01uF	50V
C014	1-128-004-11	ELECT CHIP 10uF 20%	16V	C530	1-162-918-11	CERAMIC CHIP 18PF 5%	50V
C016	1-162-974-11	CERAMIC CHIP 0.01uF	50V	C531	1-162-917-11	CERAMIC CHIP 15PF 5%	50V
C017	1-162-974-11	CERAMIC CHIP 0.01uF	50V	C532	1-162-905-11	CERAMIC CHIP 1PF 0.25PF	50V
C018	1-128-004-11	ELECT CHIP 10uF 20%	16V	C534	1-162-995-11	CERAMIC CHIP 0.022uF	50V
C019	1-162-974-11	CERAMIC CHIP 0.01uF	50V	C535	1-128-004-11	ELECT CHIP 10uF 20%	16V
C020	1-164-360-11	CERAMIC CHIP 0.1uF	16V	C536	1-128-004-11	ELECT CHIP 10uF 20%	16V
C021	1-162-974-11	CERAMIC CHIP 0.01uF	50V	C538	1-164-360-11	CERAMIC CHIP 0.1uF	16V
C022	1-164-360-11	CERAMIC CHIP 0.1uF	16V	C540	1-164-360-11	CERAMIC CHIP 0.1uF	16V
C023	1-162-974-11	CERAMIC CHIP 0.01uF	50V	C541	1-126-204-11	ELECT CHIP 47uF 20%	16V
C024	1-164-360-11	CERAMIC CHIP 0.1uF	16V	C542	1-164-360-11	CERAMIC CHIP 0.1uF	16V
C025	1-128-004-11	ELECT CHIP 10uF 20%	16V	C543	1-164-107-11	CERAMIC CHIP 0.15uF 10%	16V
C026	1-162-974-11	CERAMIC CHIP 0.01uF	50V	C544	1-164-107-11	CERAMIC CHIP 0.15uF 10%	16V
C041	1-164-633-11	CERAMIC CHIP 0.1uF 10%	25V	C546	1-164-004-11	CERAMIC CHIP 0.1uF 10%	25V
C042	1-162-953-11	CERAMIC CHIP 100PF 5%	50V	C547	1-163-037-11	CERAMIC CHIP 0.022uF 10%	25V
C043	1-162-927-11	CERAMIC CHIP 100PF 5%	50V	C548	1-164-633-11	CERAMIC CHIP 0.1uF 10%	25V
				C549	1-162-967-11	CERAMIC CHIP 0.0033uF 10%	50V
				C550	1-162-967-11	CERAMIC CHIP 0.0033uF 10%	50V
				C551	1-162-967-11	CERAMIC CHIP 0.0033uF 10%	50V
				C552	1-162-970-11	CERAMIC CHIP 0.01uF 10%	25V

Ref. No.	Part No.	Description		Remark	Ref. No.	Part No.	Description		Remark
C553	1-163-038-00	CERAMIC CHIP	0.1uF	25V	C722	1-162-974-11	CERAMIC CHIP	0.01uF	50V
C554	1-164-222-11	CERAMIC CHIP	0.22uF	25V	C724	1-162-974-11	CERAMIC CHIP	0.01uF	50V
C555	1-164-222-11	CERAMIC CHIP	0.22uF	25V	C725	1-135-181-21	TANTALUM CHIP	4.7uF	20% 6.3V
C558	1-164-360-11	CERAMIC CHIP	0.1uF	16V	C726	1-164-360-11	CERAMIC CHIP	0.1uF	16V
C559	1-126-397-11	ELECT	33uF	20% 25V	C729	1-164-360-11	CERAMIC CHIP	0.1uF	16V
C560	1-128-004-11	ELECT CHIP	10uF	20% 16V	C733	1-164-360-11	CERAMIC CHIP	0.1uF	16V
C563	1-162-966-11	CERAMIC CHIP	0.0022uF	10% 50V	C737	1-135-181-21	TANTALUM CHIP	4.7uF	20% 6.3V
C564	1-162-920-11	CERAMIC CHIP	27PF	5% 50V	C738	1-164-360-11	CERAMIC CHIP	0.1uF	16V
C565	1-164-360-11	CERAMIC CHIP	0.1uF	16V	C739	1-162-974-11	CERAMIC CHIP	0.01uF	50V
C566	1-162-917-11	CERAMIC CHIP	15PF	5% 50V	C741	1-164-360-11	CERAMIC CHIP	0.1uF	16V
C568	1-124-778-00	ELECT CHIP	22uF	20% 6.3V	C743	1-162-974-11	CERAMIC CHIP	0.01uF	50V
C569	1-164-337-11	CERAMIC CHIP	2.2uF	16V	C745	1-162-974-11	CERAMIC CHIP	0.01uF	50V
C570	1-162-962-11	CERAMIC CHIP	470PF	10% 50V	C749	1-135-181-21	TANTALUM CHIP	4.7uF	20% 6.3V
C571	1-162-961-11	CERAMIC CHIP	330PF	10% 50V	C751	1-162-974-11	CERAMIC CHIP	0.01uF	50V
C572	1-164-360-11	CERAMIC CHIP	0.1uF	16V	C752	1-164-360-11	CERAMIC CHIP	0.1uF	16V
C573	1-162-974-11	CERAMIC CHIP	0.01uF	50V	C753	1-162-974-11	CERAMIC CHIP	0.01uF	50V
C574	1-162-970-11	CERAMIC CHIP	0.01uF	10% 25V	C754	1-162-946-11	CERAMIC CHIP	27PF	5% 50V
C575	1-162-974-11	CERAMIC CHIP	0.01uF	50V	C756	1-162-974-11	CERAMIC CHIP	0.01uF	50V
C576	1-128-004-11	ELECT CHIP	10uF	20% 16V	C758	1-164-360-11	CERAMIC CHIP	0.1uF	16V
C577	1-162-927-11	CERAMIC CHIP	100PF	5% 50V	C801	1-135-259-11	TANTAL. CHIP	10uF	20% 6.3V
C578	1-164-222-11	CERAMIC CHIP	0.22uF	25V	C802	1-162-917-11	CERAMIC CHIP	15PF	5% 50V
C579	1-128-004-11	ELECT CHIP	10uF	20% 16V	C803	1-135-181-21	TANTALUM CHIP	4.7uF	20% 6.3V
C580	1-162-974-11	CERAMIC CHIP	0.01uF	50V	C804	1-162-974-11	CERAMIC CHIP	0.01uF	50V
C581	1-164-360-11	CERAMIC CHIP	0.1uF	16V	C805	1-162-974-11	CERAMIC CHIP	0.01uF	50V
C582	1-162-964-11	CERAMIC CHIP	0.001uF	10% 50V	C806	1-162-964-11	CERAMIC CHIP	0.001uF	10% 50V
C583	1-128-004-11	ELECT CHIP	10uF	20% 16V	C807	1-162-974-11	CERAMIC CHIP	0.01uF	50V
C584	1-128-004-11	ELECT CHIP	10uF	20% 16V	C808	1-135-091-91	TANTAL. CHIP	1uF	20% 16V
C586	1-162-918-11	CERAMIC CHIP	18PF	5% 50V	C809	1-135-181-21	TANTALUM CHIP	4.7uF	20% 6.3V
C587	1-162-921-11	CERAMIC CHIP	33PF	5% 50V	C810	1-163-077-91	CERAMIC CHIP	0.1uF	50V
C588	1-162-964-11	CERAMIC CHIP	0.001uF	10% 50V	C811	1-164-360-11	CERAMIC CHIP	0.1uF	16V
C589	1-164-633-11	CERAMIC CHIP	0.1uF	10% 25V	C813	1-164-360-11	CERAMIC CHIP	0.1uF	16V
C590	1-162-964-11	CERAMIC CHIP	0.001uF	10% 50V	C814	1-162-964-11	CERAMIC CHIP	0.001uF	10% 50V
C591	1-162-969-11	CERAMIC CHIP	0.0068uF	10% 25V	C815	1-135-181-21	TANTALUM CHIP	4.7uF	20% 6.3V
C592	1-162-969-11	CERAMIC CHIP	0.0068uF	10% 25V	C816	1-162-974-11	CERAMIC CHIP	0.01uF	50V
C595	1-162-974-11	CERAMIC CHIP	0.01uF	50V	C817	1-162-974-11	CERAMIC CHIP	0.01uF	50V
C701	1-135-149-21	TANTALUM CHIP	2.2uF	20% 10V	C818	1-135-091-91	TANTAL. CHIP	1uF	20% 16V
C702	1-164-633-11	CERAMIC CHIP	0.1uF	10% 25V	C819	1-164-360-11	CERAMIC CHIP	0.1uF	16V
C703	1-162-974-11	CERAMIC CHIP	0.01uF	50V	C820	1-135-091-91	TANTAL. CHIP	1uF	20% 16V
C705	1-164-360-11	CERAMIC CHIP	0.1uF	16V	C821	1-162-947-11	CERAMIC CHIP	33PF	5% 50V
C707	1-162-974-11	CERAMIC CHIP	0.01uF	50V	C823	1-135-091-91	TANTAL. CHIP	1uF	20% 16V
C708	1-162-974-11	CERAMIC CHIP	0.01uF	50V	C826	1-164-360-11	CERAMIC CHIP	0.1uF	16V
C709	1-162-638-11	CERAMIC CHIP	1uF	16V	C828	1-163-077-91	CERAMIC CHIP	0.1uF	50V
C710	1-162-974-11	CERAMIC CHIP	0.01uF	50V	C831	1-163-077-91	CERAMIC CHIP	0.1uF	50V
C711	1-135-181-21	TANTALUM CHIP	4.7uF	20% 6.3V	C832	1-162-964-11	CERAMIC CHIP	0.001uF	10% 50V
C712	1-164-360-11	CERAMIC CHIP	0.1uF	16V	C833	1-162-974-11	CERAMIC CHIP	0.01uF	50V
C713	1-163-077-91	CERAMIC CHIP	0.1uF	50V	C834	1-163-077-91	CERAMIC CHIP	0.1uF	50V
C714	1-164-360-11	CERAMIC CHIP	0.1uF	16V	C835	1-162-974-11	CERAMIC CHIP	0.01uF	50V
C718	1-164-360-11	CERAMIC CHIP	0.1uF	16V	C836	1-126-205-11	ELECT CHIP	47uF	20% 6.3V
C719	1-162-974-11	CERAMIC CHIP	0.01uF	50V	C837	1-162-974-11	CERAMIC CHIP	0.01uF	50V
C721	1-164-360-11	CERAMIC CHIP	0.1uF	16V	C838	1-135-145-11	TANTALUM CHIP	0.47uF	10% 35V

Ref. No.	Part No.	Description	Remark	Ref. No.	Part No.	Description	Remark
C839	1-162-974-11	CERAMIC CHIP	0.01uF 50V	D514	8-719-420-14	DIODE MA8082-M	
C840	1-164-337-11	CERAMIC CHIP	2.2uF 16V	D515	8-719-420-14	DIODE MA8082-M	
C851	1-164-633-11	CERAMIC CHIP	0.1uF 10% 25V	D516	8-719-420-14	DIODE MA8082-M	
C852	1-162-964-11	CERAMIC CHIP	0.001uF 10% 50V	D518	8-719-420-14	DIODE MA8082-M	
C853	1-162-638-11	CERAMIC CHIP	1uF 16V	D519	8-719-420-14	DIODE MA8082-M	
C854	1-162-974-11	CERAMIC CHIP	0.01uF 50V	D520	8-719-420-14	DIODE MA8082-M	
C855	1-164-360-11	CERAMIC CHIP	0.1uF 16V	D521	8-719-420-14	DIODE MA8082-M	
C856	1-162-974-11	CERAMIC CHIP	0.01uF 50V	D522	8-719-420-14	DIODE MA8082-M	
C857	1-164-360-11	CERAMIC CHIP	0.1uF 16V	D523	8-719-420-14	DIODE MA8082-M	
C858	1-162-974-11	CERAMIC CHIP	0.01uF 50V	D524	8-719-420-14	DIODE MA8082-M	
C859	1-128-004-11	ELECT CHIP	10uF 20% 16V	D525	8-719-420-14	DIODE MA8082-M	
C861	1-162-974-11	CERAMIC CHIP	0.01uF 50V	D801	8-719-420-14	DIODE MA8082-M	
C862	1-162-974-11	CERAMIC CHIP	0.01uF 50V	< COIL >			
C863	1-162-974-11	CERAMIC CHIP	0.01uF 50V	FL701	1-406-452-11	COIL, OSC	
C864	1-162-638-11	CERAMIC CHIP	1uF 16V	< IC >			
C865	1-135-165-11	TANTAL. CHIP	33uF 20% 16V	IC001	8-752-033-38	IC CXA1202R (REC/PB AMP)	
C866	1-164-360-11	CERAMIC CHIP	0.1uF 16V	IC501	8-759-058-96	IC TB1206F	
C868	1-164-360-11	CERAMIC CHIP	0.1uF 16V	(ATF SERVO, SP/LP, CLOG, DETECT)			
C869	1-164-005-11	CERAMIC CHIP	0.47uF 25V	IC502	8-759-999-02	IC TL1596CDB (LANC I/O)	
C870	1-164-173-11	CERAMIC CHIP	0.0039uF 10% 50V	IC503	8-752-841-67	IC CXP80624-444Q (SERVO/SYSTEM CONTROL)	
C872	1-162-638-11	CERAMIC CHIP	1uF 16V	IC505	8-759-169-11	IC CXA1575M-E2 (DRUM MOTOR DIRVE)	
C875	1-135-259-11	TANTAL. CHIP	10uF 20% 6.3V	IC506	8-759-158-55	IC uPD75316GF-354-3B9 (MODE CONTROL)	
< CONNECTOR >				IC507	8-759-056-84	IC S-8420AF (BATTERY BACKUP SELECTOR)	
CN001	1-569-775-21	PIN, CONNECTOR 5P		IC509	8-759-145-63	IC uPD7564G-540 (SIRCS CONTROL)	
CN002	1-691-492-21	CONNECTOR, FFC/FPC 13P		IC510	8-759-039-01	IC MPC1720M (LOADING MOTOR DRIVE)	
CN501	1-691-520-11	CONNECTOR, BOARD TO BOARD 48P		IC511	8-759-278-57	IC AK6420HF-E2 (EEP ROM)	
CN502	1-691-539-11	CONNECTOR, BOARD TO BOARD 30P		IC701	8-759-031-58	IC SC7SU04F (INVERTER)	
CN503	1-691-530-11	CONNECTOR, BOARD TO BOARD 40P		IC702	8-759-635-27	IC M62352GP (EVR)	
CN504	1-691-524-11	CONNECTOR, BOARD TO BOARD 20P		IC703	8-759-069-29	IC uPD6456GS-618 (ON SCREEN DISPLAY)	
CN505	1-691-495-21	CONNECTOR, FFC/FPC 16P		IC704	8-752-358-10	IC CXD2101BR-T6 (SYNC GENERATOR)	
CN507	1-691-494-21	CONNECTOR, FFC/FPC 15P		IC705	8-759-069-18	IC CXD2103AR (OPD)	
CN701	1-573-372-21	CONNECTOR, BOARD TO BOARD 18P		IC706	8-752-355-56	IC CXD2104BN (FOCUS PRE DRIVER)	
CN801	1-691-475-21	CONNECTOR, BOARD TO BOARD 18P		IC707	8-752-347-93	IC CXD2100AQ (CAM CORE)	
CN851	1-573-361-11	CONNECTOR, FFC/FPC 21P		IC709	8-752-837-59	IC CXP80624-299Q (CAMERA CONTROL)	
< TRIMMER >				IC712	8-759-159-70	IC BR9021BF (EEP ROM)	
CT801	1-141-356-11	CAP, ADJ (6PF)		IC801	8-752-350-16	IC CXD1257AR (TIMING GENERATOR)	
< DIODE >				IC802	8-752-060-50	IC CXA1577R (A/D CONVERTER)	
△D501	8-719-421-27	DIODE MA728		IC803	8-752-053-26	IC CXA1399Q (A/D BIAS AMP)	
D502	8-719-404-46	DIODE MA110		IC804	8-752-327-48	IC CXD1250N (V DRIVE)	
D503	8-719-420-14	DIODE MA8082-M		IC805	8-752-054-61	IC CXA1390AR	
D504	8-719-404-35	DIODE MA141WK		(AGC/IRIS CONTROL, SIGNAL SEPARATION)			
D505	8-719-404-46	DIODE MA110		IC851	8-759-701-24	IC NJM3414M (IRIS DRIVE, HALL AMP)	
D507	8-719-404-46	DIODE MA110		IC852	8-759-060-00	IC BA324DR-E1 (HALL GAIN/BIAS CONTROL)	
D510	8-719-420-14	DIODE MA8082-M		IC853	8-759-038-81	IC MPC1724M (FOCUS MOTOR DRIVE)	
D511	8-719-420-14	DIODE MA8082-M		IC854	8-759-823-51	IC LB1830M (ZOOM MOTOR DRIVE)	
D512	8-719-420-14	DIODE MA8082-M		IC855	8-759-998-98	IC LM358D (ZOOM POSX4/LPF)	
D513	8-719-420-14	DIODE MA8082-M					

The components identified by mark Δ or dotted line with mark Δ are critical for safety.
Replace only with part number specified.

Les composants identifiés par une marque Δ sont critiques pour la sécurité.
Ne les remplacer que par une pièce portant le numéro spécifié.

Ref. No.	Part No.	Description	Remark	Ref. No.	Part No.	Description	Remark
< COIL >							
L001	1-412-033-11	INDUCTOR CHIP 220uH		Q703	8-729-230-60	TRANSISTOR 2SA1586-YG	
L002	1-412-033-11	INDUCTOR CHIP 220uH		Q704	8-729-230-60	TRANSISTOR 2SA1586-YG	
L003	1-412-033-11	INDUCTOR CHIP 220uH		Q707	8-729-230-63	TRANSISTOR 2SC4116-YG	
L004	1-412-029-11	INDUCTOR CHIP 10uH		Q708	8-729-014-16	TRANSISTOR RN2302-TE85L	
L041	1-412-033-11	INDUCTOR CHIP 220uH		Q709	8-729-402-45	TRANSISTOR UN5212	
L042	1-410-381-11	INDUCTOR CHIP 10uH		Q801	8-729-423-55	TRANSISTOR 2SC3931-D	
L501	1-412-029-11	INDUCTOR CHIP 10uH		Q802	8-729-403-27	TRANSISTOR XN4401	
L502	1-412-029-11	INDUCTOR CHIP 10uH		Q851	8-729-230-63	TRANSISTOR 2SC4116-YG	
L503	1-412-028-11	INDUCTOR CHIP 4.7uH		Q853	8-729-403-27	TRANSISTOR XN4401	
L504	1-412-028-11	INDUCTOR CHIP 4.7uH		< RESISTOR >			
L506	1-412-029-11	INDUCTOR CHIP 10uH		R001	1-216-823-11	METAL CHIP 1.5K 5% 1/16W	
L703	1-412-006-31	INDUCTOR CHIP 10uH		R003	1-216-837-11	METAL CHIP 22K 5% 1/16W	
L704	1-412-006-31	INDUCTOR CHIP 10uH		R004	1-216-838-11	METAL CHIP 27K 5% 1/16W	
L706	1-412-029-11	INDUCTOR CHIP 10uH		R005	1-216-835-11	METAL CHIP 15K 5% 1/16W	
L714	1-412-011-31	INDUCTOR CHIP 27uH		R006	1-216-791-11	METAL CHIP 3.3 5% 1/16W	
L715	1-412-029-11	INDUCTOR CHIP 10uH		R007	1-216-838-11	METAL CHIP 27K 5% 1/16W	
L716	1-412-026-11	INDUCTOR CHIP 1uH		R008	1-216-838-11	METAL CHIP 27K 5% 1/16W	
L717	1-412-029-11	INDUCTOR CHIP 10uH		R009	1-216-841-11	METAL CHIP 47K 5% 1/16W	
L719	1-412-006-31	INDUCTOR CHIP 10uH		R011	1-216-838-11	METAL CHIP 27K 5% 1/16W	
L722	1-412-006-31	INDUCTOR CHIP 10uH		R012	1-216-837-11	METAL CHIP 22K 5% 1/16W	
L723	1-410-391-11	INDUCTOR CHIP 68uH		R013	1-216-823-11	METAL CHIP 1.5K 5% 1/16W	
L730	1-216-295-00	METAL CHIP 0	5% 1/10W	R014	1-216-791-11	METAL CHIP 3.3 5% 1/16W	
L731	1-412-026-11	INDUCTOR CHIP 1uH		R015	1-216-841-11	METAL CHIP 47K 5% 1/16W	
L732	1-412-026-11	INDUCTOR CHIP 1uH		R016	1-216-832-11	METAL CHIP 8.2K 5% 1/16W	
L733	1-216-864-11	METAL CHIP 0	5% 1/16W	R017	1-216-837-11	METAL CHIP 22K 5% 1/16W	
L734	1-216-864-11	METAL CHIP 0	5% 1/16W	R018	1-216-832-11	METAL CHIP 8.2K 5% 1/16W	
L801	1-412-029-11	INDUCTOR CHIP 10uH		R019	1-216-824-11	METAL CHIP 1.8K 5% 1/16W	
L802	1-412-006-31	INDUCTOR CHIP 10uH		R020	1-216-831-11	METAL CHIP 6.8K 5% 1/16W	
L803	1-412-029-11	INDUCTOR CHIP 10uH		R021	1-216-828-11	METAL CHIP 3.9K 5% 1/16W	
L804	1-412-029-11	INDUCTOR CHIP 10uH		R022	1-216-864-11	METAL CHIP 0 5% 1/16W	
L851	1-412-029-11	INDUCTOR CHIP 10uH		R023	1-216-838-11	METAL CHIP 27K 5% 1/16W	
L852	1-410-993-11	INDUCTOR CHIP 1uH		R024	1-216-826-11	METAL CHIP 2.7K 5% 1/16W	
L853	1-412-029-11	INDUCTOR CHIP 10uH		R026	1-216-817-11	METAL CHIP 470 5% 1/16W	
< IC LINK >				R041	1-216-837-11	METAL CHIP 22K 5% 1/16W	
△PS501	1-576-123-21	LINK, IC (CCP2E-20)		R042	1-216-839-11	METAL CHIP 33K 5% 1/16W	
△PS502	1-576-123-21	LINK, IC (CCP2E-20)		R043	1-216-814-11	METAL CHIP 270 5% 1/16W	
< TRANSISTOR >				R044	1-216-813-11	METAL CHIP 220 5% 1/16W	
Q002	8-729-230-63	TRANSISTOR 2SC4116-YG		R045	1-216-803-11	METAL CHIP 33 5% 1/16W	
Q003	8-729-403-35	TRANSISTOR UN5113		R046	1-216-806-11	METAL GLAZE 56 5% 1/16W	
Q041	8-729-230-60	TRANSISTOR 2SA1586-YG		R047	1-216-818-11	METAL CHIP 560 5% 1/16W	
Q042	8-729-014-16	TRANSISTOR RN2302-TE85L		R501	1-216-839-11	METAL CHIP 33K 5% 1/16W	
Q043	8-729-216-22	TRANSISTOR 2SA1162-G		R502	1-216-837-11	METAL CHIP 22K 5% 1/16W	
Q501	8-729-013-88	TRANSISTOR RN1302-TE85L		R503	1-216-837-11	METAL CHIP 22K 5% 1/16W	
Q504	8-729-402-48	TRANSISTOR UN521E		R504	1-216-845-11	METAL CHIP 100K 5% 1/16W	
Q507	8-729-403-35	TRANSISTOR UN5113		R505	1-216-817-11	METAL CHIP 470 5% 1/16W	
Q509	8-729-822-84	TRANSISTOR 2SB1202FAST		R506	1-216-852-11	METAL CHIP 390K 5% 1/16W	
Q702	8-729-402-84	TRANSISTOR XN4601		R507	1-216-849-11	METAL CHIP 220K 5% 1/16W	
				R508	1-218-863-11	METAL CHIP 4.7K 0.50% 1/16W	
				R509	1-218-879-11	METAL CHIP 22K 0.50% 1/16W	
				R510	1-216-845-11	METAL CHIP 100K 5% 1/16W	

The components identified by mark △ or dotted line with mark △ are critical for safety.
Replace only with part number specified.

Les composants identifiés par une marque △ sont critiques pour la sécurité.
Ne les remplacer que par une pièce portant le numéro spécifié.

Ref. No.	Part No.	Description	Remark	Ref. No.	Part No.	Description	Remark
R511	1-216-833-11	METAL CHIP	10K 5% 1/16W	R577	1-216-821-11	METAL CHIP	1K 5% 1/16W
R512	1-216-829-11	METAL CHIP	4.7K 5% 1/16W	R578	1-216-841-11	METAL CHIP	47K 5% 1/16W
R513	1-216-845-11	METAL CHIP	100K 5% 1/16W	R579	1-216-829-11	METAL CHIP	4.7K 5% 1/16W
R514	1-216-857-11	METAL CHIP	1M 5% 1/16W	R580	1-216-845-11	METAL CHIP	100K 5% 1/16W
R515	1-216-841-11	METAL CHIP	47K 5% 1/16W	R581	1-216-841-11	METAL CHIP	47K 5% 1/16W
R516	1-216-841-11	METAL CHIP	47K 5% 1/16W	R582	1-216-821-11	METAL CHIP	1K 5% 1/16W
R517	1-216-833-11	METAL CHIP	10K 5% 1/16W	R583	1-216-821-11	METAL CHIP	1K 5% 1/16W
R518	1-216-809-11	METAL CHIP	100 5% 1/16W	R584	1-216-833-11	METAL CHIP	10K 5% 1/16W
R520	1-216-833-11	METAL CHIP	10K 5% 1/16W	R587	1-216-841-11	METAL CHIP	47K 5% 1/16W
R521	1-216-841-11	METAL CHIP	47K 5% 1/16W	R588	1-216-841-11	METAL CHIP	47K 5% 1/16W
R522	1-216-837-11	METAL CHIP	22K 5% 1/16W	R589	1-216-845-11	METAL CHIP	100K 5% 1/16W
R523	1-216-837-11	METAL CHIP	22K 5% 1/16W	R590	1-216-831-11	METAL CHIP	6.8K 5% 1/16W
R524	1-216-845-11	METAL CHIP	100K 5% 1/16W	R591	1-216-845-11	METAL CHIP	100K 5% 1/16W
R526	1-216-833-11	METAL CHIP	10K 5% 1/16W	R592	1-216-845-11	METAL CHIP	100K 5% 1/16W
R527	1-216-833-11	METAL CHIP	10K 5% 1/16W	R594	1-216-833-11	METAL CHIP	10K 5% 1/16W
R528	1-216-821-11	METAL CHIP	1K 5% 1/16W	R596	1-216-821-11	METAL CHIP	1K 5% 1/16W
R530	1-216-813-11	METAL CHIP	220 5% 1/16W	R600	1-216-809-11	METAL CHIP	100 5% 1/16W
R531	1-216-864-11	METAL CHIP	0 5% 1/16W	R601	1-216-826-11	METAL CHIP	2.7K 5% 1/16W
R532	1-216-833-11	METAL CHIP	10K 5% 1/16W	R603	1-216-845-11	METAL CHIP	100K 5% 1/16W
R533	1-216-827-11	METAL CHIP	3.3K 5% 1/16W	R607	1-216-295-00	METAL CHIP	0 5% 1/10W
R534	1-216-821-11	METAL CHIP	1K 5% 1/16W	R608	1-216-295-00	METAL CHIP	0 5% 1/10W
R536	1-216-821-11	METAL CHIP	1K 5% 1/16W	R609	1-216-821-11	METAL CHIP	1K 5% 1/16W
R537	1-216-845-11	METAL CHIP	100K 5% 1/16W	R611	1-216-864-11	METAL CHIP	0 5% 1/16W
R538	1-216-833-11	METAL CHIP	10K 5% 1/16W	R618	1-216-821-11	METAL CHIP	1K 5% 1/16W
R539	1-216-821-11	METAL CHIP	1K 5% 1/16W	R619	1-216-821-11	METAL CHIP	1K 5% 1/16W
R545	1-216-019-00	METAL CHIP	56 5% 1/10W	R620	1-216-821-11	METAL CHIP	1K 5% 1/16W
R546	1-216-864-11	METAL CHIP	0 5% 1/16W	R621	1-216-821-11	METAL CHIP	1K 5% 1/16W
R547	1-216-827-11	METAL CHIP	3.3K 5% 1/16W	R622	1-216-821-11	METAL CHIP	1K 5% 1/16W
R549	1-217-671-11	METAL CHIP	1 5% 1/10W	R623	1-216-821-11	METAL CHIP	1K 5% 1/16W
R550	1-217-671-11	METAL CHIP	1 5% 1/10W	R624	1-216-821-11	METAL CHIP	1K 5% 1/16W
R551	1-217-671-11	METAL CHIP	1 5% 1/10W	R625	1-216-821-11	METAL CHIP	1K 5% 1/16W
R552	1-217-671-11	METAL CHIP	1 5% 1/10W	R628	1-216-833-11	METAL CHIP	10K 5% 1/16W
R553	1-216-845-11	METAL CHIP	100K 5% 1/16W	R629	1-216-833-11	METAL CHIP	10K 5% 1/16W
R556	1-216-821-11	METAL CHIP	1K 5% 1/16W	R642	1-216-841-11	METAL CHIP	47K 5% 1/16W
R558	1-216-821-11	METAL CHIP	1K 5% 1/16W	R643	1-216-841-11	METAL CHIP	47K 5% 1/16W
R560	1-216-864-11	METAL CHIP	0 5% 1/16W	R648	1-216-845-11	METAL CHIP	100K 5% 1/16W
R562	1-216-833-11	METAL CHIP	10K 5% 1/16W	R649	1-216-845-11	METAL CHIP	100K 5% 1/16W
R563	1-216-827-11	METAL CHIP	3.3K 5% 1/16W	R650	1-216-851-11	METAL CHIP	330K 5% 1/16W
R564	1-216-851-11	METAL CHIP	330K 5% 1/16W	R651	1-216-851-11	METAL CHIP	330K 5% 1/16W
R565	1-216-837-11	METAL CHIP	22K 5% 1/16W	R652	1-216-821-11	METAL CHIP	1K 5% 1/16W
R566	1-216-841-11	METAL CHIP	47K 5% 1/16W	R653	1-216-821-11	METAL CHIP	1K 5% 1/16W
R568	1-216-833-11	METAL CHIP	10K 5% 1/16W	R654	1-216-821-11	METAL CHIP	1K 5% 1/16W
R569	1-216-817-11	METAL CHIP	470 5% 1/16W	R655	1-216-821-11	METAL CHIP	1K 5% 1/16W
R570	1-216-845-11	METAL CHIP	100K 5% 1/16W	R656	1-216-821-11	METAL CHIP	1K 5% 1/16W
R571	1-216-821-11	METAL CHIP	1K 5% 1/16W	R657	1-216-821-11	METAL CHIP	1K 5% 1/16W
R572	1-216-821-11	METAL CHIP	1K 5% 1/16W	R658	1-216-821-11	METAL CHIP	1K 5% 1/16W
R573	1-216-827-11	METAL CHIP	3.3K 5% 1/16W	R659	1-216-821-11	METAL CHIP	1K 5% 1/16W
R574	1-216-821-11	METAL CHIP	1K 5% 1/16W	R660	1-216-845-11	METAL CHIP	100K 5% 1/16W
R575	1-216-851-11	METAL CHIP	330K 5% 1/16W	R661	1-216-845-11	METAL CHIP	100K 5% 1/16W
R576	1-216-864-11	METAL CHIP	0 5% 1/16W	R662	1-216-845-11	METAL CHIP	100K 5% 1/16W

Ref. No.	Part No.	Description	Remark			Ref. No.	Part No.	Description	Remark		
R663	1-216-845-11	METAL CHIP	100K	5%	1/16W	R763	1-216-833-11	METAL CHIP	10K	5%	1/16W
R664	1-216-833-11	METAL CHIP	10K	5%	1/16W	R764	1-216-839-11	METAL CHIP	33K	5%	1/16W
R665	1-216-833-11	METAL CHIP	10K	5%	1/16W	R765	1-216-814-11	METAL CHIP	270	5%	1/16W
R666	1-216-833-11	METAL CHIP	10K	5%	1/16W	R766	1-216-833-11	METAL CHIP	10K	5%	1/16W
R667	1-216-833-11	METAL CHIP	10K	5%	1/16W	R767	1-216-833-11	METAL CHIP	10K	5%	1/16W
R701	1-216-857-11	METAL CHIP	1M	5%	1/16W	R769	1-216-833-11	METAL CHIP	10K	5%	1/16W
R702	1-216-821-11	METAL CHIP	1K	5%	1/16W	R770	1-216-825-11	METAL CHIP	2.2K	5%	1/16W
R703	1-216-837-11	METAL CHIP	22K	5%	1/16W	R772	1-216-864-11	METAL CHIP	0	5%	1/16W
R704	1-216-815-11	METAL CHIP	330	5%	1/16W	R773	1-216-864-11	METAL CHIP	0	5%	1/16W
R705	1-216-833-11	METAL CHIP	10K	5%	1/16W	R774	1-216-841-11	METAL CHIP	47K	5%	1/16W
R707	1-216-825-11	METAL CHIP	2.2K	5%	1/16W	R775	1-216-821-11	METAL CHIP	1K	5%	1/16W
R708	1-216-845-11	METAL CHIP	100K	5%	1/16W	R776	1-216-833-11	METAL CHIP	10K	5%	1/16W
R709	1-216-839-11	METAL CHIP	33K	5%	1/16W	R778	1-216-833-11	METAL CHIP	10K	5%	1/16W
R712	1-216-821-11	METAL CHIP	1K	5%	1/16W	R783	1-216-825-11	METAL CHIP	2.2K	5%	1/16W
R713	1-216-821-11	METAL CHIP	1K	5%	1/16W	R784	1-216-833-11	METAL CHIP	10K	5%	1/16W
R714	1-216-821-11	METAL CHIP	1K	5%	1/16W	R785	1-216-833-11	METAL CHIP	10K	5%	1/16W
R715	1-216-821-11	METAL CHIP	1K	5%	1/16W	R787	1-216-821-11	METAL CHIP	1K	5%	1/16W
R718	1-216-825-11	METAL CHIP	2.2K	5%	1/16W	R788	1-216-825-11	METAL CHIP	2.2K	5%	1/16W
R720	1-216-864-11	METAL CHIP	0	5%	1/16W	R789	1-216-821-11	METAL CHIP	1K	5%	1/16W
R722	1-216-821-11	METAL CHIP	1K	5%	1/16W	R793	1-216-823-11	METAL CHIP	1.5K	5%	1/16W
R724	1-216-821-11	METAL CHIP	1K	5%	1/16W	R794	1-216-841-11	METAL CHIP	47K	5%	1/16W
R727	1-216-821-11	METAL CHIP	1K	5%	1/16W	R795	1-216-841-11	METAL CHIP	47K	5%	1/16W
R728	1-216-821-11	METAL CHIP	1K	5%	1/16W	R796	1-216-825-11	METAL CHIP	2.2K	5%	1/16W
R729	1-216-821-11	METAL CHIP	1K	5%	1/16W	R797	1-216-825-11	METAL CHIP	2.2K	5%	1/16W
R730	1-216-864-11	METAL CHIP	0	5%	1/16W	R799	1-216-821-11	METAL CHIP	1K	5%	1/16W
R732	1-216-821-11	METAL CHIP	1K	5%	1/16W	R802	1-216-835-11	METAL CHIP	15K	5%	1/16W
R733	1-216-822-11	METAL CHIP	1.2K	5%	1/16W	R804	1-216-833-11	METAL CHIP	10K	5%	1/16W
R734	1-216-817-11	METAL CHIP	470	5%	1/16W	R805	1-216-845-11	METAL CHIP	100K	5%	1/16W
R735	1-216-834-11	METAL CHIP	12K	5%	1/16W	R808	1-216-801-11	METAL CHIP	22	5%	1/16W
R736	1-216-827-11	METAL CHIP	3.3K	5%	1/16W	R810	1-216-825-11	METAL CHIP	2.2K	5%	1/16W
R737	1-216-813-11	METAL CHIP	220	5%	1/16W	R811	1-216-833-11	METAL CHIP	10K	5%	1/16W
R738	1-216-825-11	METAL CHIP	2.2K	5%	1/16W	R812	1-216-825-11	METAL CHIP	2.2K	5%	1/16W
R739	1-216-833-11	METAL CHIP	10K	5%	1/16W	R813	1-216-825-11	METAL CHIP	2.2K	5%	1/16W
R740	1-216-841-11	METAL CHIP	47K	5%	1/16W	R814	1-216-823-11	METAL CHIP	1.5K	5%	1/16W
R741	1-216-864-11	METAL CHIP	0	5%	1/16W	R815	1-216-819-11	METAL CHIP	680	5%	1/16W
R742	1-216-821-11	METAL CHIP	1K	5%	1/16W	R816	1-216-824-11	METAL CHIP	1.8K	5%	1/16W
R743	1-216-295-00	METAL CHIP	0	5%	1/10W	R819	1-216-805-11	METAL CHIP	47	5%	1/16W
R744	1-216-295-00	METAL CHIP	0	5%	1/10W	R823	1-218-876-11	METAL CHIP	16K	0.50%	1/16W
R745	1-216-827-11	METAL CHIP	3.3K	5%	1/16W	R825	1-216-832-11	METAL CHIP	8.2K	5%	1/16W
R747	1-216-864-11	METAL CHIP	0	5%	1/16W	R826	1-216-837-11	METAL CHIP	22K	5%	1/16W
R749	1-216-841-11	METAL CHIP	47K	5%	1/16W	R828	1-218-847-11	METAL CHIP	1K	0.50%	1/16W
R752	1-216-816-11	METAL CHIP	390	5%	1/16W	R836	1-216-859-11	METAL GLAZE	1.5M	5%	1/16W
R753	1-216-834-11	METAL CHIP	12K	5%	1/16W	R851	1-216-837-11	METAL CHIP	22K	5%	1/16W
R754	1-216-821-11	METAL CHIP	1K	5%	1/16W	R852	1-216-821-11	METAL CHIP	1K	5%	1/16W
R755	1-216-833-11	METAL CHIP	10K	5%	1/16W	R853	1-216-828-11	METAL CHIP	3.9K	5%	1/16W
R756	1-216-857-11	METAL CHIP	1M	5%	1/16W	R854	1-216-833-11	METAL CHIP	10K	5%	1/16W
R757	1-216-857-11	METAL CHIP	1M	5%	1/16W	R855	1-216-826-11	METAL CHIP	2.7K	5%	1/16W
R758	1-216-841-11	METAL CHIP	47K	5%	1/16W	R857	1-216-848-11	METAL CHIP	180K	5%	1/16W
R759	1-216-821-11	METAL CHIP	1K	5%	1/16W	R858	1-216-837-11	METAL CHIP	22K	5%	1/16W
R760	1-216-857-11	METAL CHIP	1M	5%	1/16W	R859	1-216-845-11	METAL CHIP	100K	5%	1/16W

CS-48**FF-75****FP-442****LM-40****LS-33**

Ref. No.	Part No.	Description	Remark	Ref. No.	Part No.	Description	Remark
R860	1-216-833-11	METAL CHIP	10K 5% 1/16W			< VIBRATOR >	
R861	1-216-833-11	METAL CHIP	10K 5% 1/16W				
R862	1-216-848-11	METAL CHIP	180K 5% 1/16W	X501	1-579-367-21	VIBRATOR, CRYSTAL (11.89MHz)	
R863	1-216-855-11	METAL CHIP	680K 5% 1/16W	X502	1-579-550-11	VIBRATOR, CRYSTAL (32kHz)	
R864	1-216-833-11	METAL CHIP	10K 5% 1/16W	X503	1-578-713-21	VIBLATOR, CERAMIC (4.19MHz)	
				X504	1-579-551-11	VIBRATOR, CERAMIC (700kHz)	
R865	1-218-879-11	METAL CHIP	22K 0.50% 1/16W	X701	1-579-553-11	VIBRATOR	
R866	1-216-820-11	METAL CHIP	820 5% 1/16W				
R867	1-216-837-11	METAL CHIP	22K 5% 1/16W	X801	1-579-042-11	VIBRATOR, CRYSTAL (28.63636MHz)	
R868	1-216-833-11	METAL CHIP	10K 5% 1/16W				
R869	1-218-899-11	METAL CHIP	150K 0.50% 1/16W				
R870	1-216-841-11	METAL CHIP	47K 5% 1/16W				
R871	1-218-871-11	METAL CHIP	10K 0.50% 1/16W	*	A-7071-913-A	FF-75 BOARD, COMPLETE (FX330)	
R872	1-216-851-11	METAL CHIP	330K 5% 1/16W			*****	
R873	1-216-816-11	METAL CHIP	390 5% 1/16W			(Ref.No. 7,000 Series)	
R874	1-216-842-11	METAL CHIP	56K 5% 1/16W				
						< FLUORESCENT TUBE >	
R875	1-216-134-00	METAL CHIP	2.2 5% 1/8W	BL951	1-519-746-21	TUBE, FLUORESCENT (0.7 INCH)	
R876	1-216-829-11	METAL CHIP	4.7K 5% 1/16W				
R877	1-218-881-11	METAL CHIP	27K 0.50% 1/16W			< CONNECTOR >	
R880	1-216-841-11	METAL CHIP	47K 5% 1/16W				
R884	1-216-837-11	METAL CHIP	22K 5% 1/16W	CN954	1-580-248-31	CONNECTOR, BOARD TO BOARD 20P (FX330)	
R885	1-216-827-11	METAL CHIP	3.3K 5% 1/16W				
R888	1-216-821-11	METAL CHIP	1K 5% 1/16W				
R889	1-216-821-11	METAL CHIP	1K 5% 1/16W			FP-442 BOARD (Ref.No. 5,000 Series)	
R890	1-216-825-11	METAL CHIP	2.2K 5% 1/16W			*****	
R891	1-216-825-11	METAL CHIP	2.2K 5% 1/16W				
						1-641-639-13	FP-442 FLEXIBLE BOARD
R892	1-216-825-11	METAL CHIP	2.2K 5% 1/16W				
R893	1-216-825-11	METAL CHIP	2.2K 5% 1/16W			< SWITCH >	
R894	1-216-825-11	METAL CHIP	2.2K 5% 1/16W				
R895	1-216-825-11	METAL CHIP	2.2K 5% 1/16W	S001	1-572-986-11	SWTICH, ROTARY (ENCODER) (MODE)	
R898	1-216-841-11	METAL CHIP	47K 5% 1/16W	S005	1-570-771-21	SWITCH (CC DOWN)	
R899	1-216-841-11	METAL CHIP	47K 5% 1/16W				
		< NETWORK >					
RB502	1-236-424-11	NETWORK, RES 10K				LM-40 BOARD (Ref.No. 3,000 Series)	
RB505	1-236-428-11	NETWORK, RES 22K				*****	
RB512	1-236-424-11	NETWORK, RES 10K				< CONNECTOR >	
RB522	1-236-424-11	NETWORK, RES 10K					
RB523	1-236-424-11	NETWORK, RES 10K		CN512	1-568-323-11	CONNECTOR, BOARD TO BOARD 4P	
RB526	1-236-408-11	NETWORK, RES 470					
RB527	1-236-432-11	NETWORK, RES 47K					
RB528	1-236-432-11	NETWORK, RES 47K				LS-33 BOARD (Ref.No. 4,000 Series)	
RB529	1-236-428-11	NETWORK, RES 22K				*****	
RB530	1-236-428-11	NETWORK, RES 22K				< DIODE >	
RB702	1-236-432-11	NETWORK, RES 47K		D001	8-719-989-52	DIODE GL4600S	
RB710	1-236-412-11	NETWORK, RES 1.0K					
RB711	1-236-412-11	NETWORK, RES 1.0K				< HALL ELEMENT >	
RB712	1-236-412-11	NETWORK, RES 1.0K					
RB713	1-236-412-11	NETWORK, RES 1.0K		H001	8-719-987-62	DIODE LT140SAZ	
				H002	8-719-987-62	DIODE LT140SAZ	

Ref. No.	Part No.	Description	Remark
< TRANSISTOR >			
Q001	8-729-012-46	TRANSISTOR PT4600FS	
Q002	8-729-012-46	TRANSISTOR PT4600FS	
< RESISTOR >			
R003	1-216-033-00	METAL CHIP 220 5% 1/10W	
R004	1-216-033-00	METAL CHIP 220 5% 1/10W	
R010	1-216-033-00	METAL CHIP 220 5% 1/10W	
R011	1-216-033-00	METAL CHIP 220 5% 1/10W	
< SWITCH >			
S002	1-572-987-11	SWITCH, PUSH (3 KEY) (TAPE SELECT, REC PROOF)	

*	A-7066-169-A	MA-226 BOARD, COMPLETE ***** (Ref. No. 5,000 Series)	
< CAPACITOR >			
C400	1-162-964-11	CERAMIC CHIP 0.001uF 10% 50V	
C401	1-164-677-11	CERAMIC CHIP 0.033uF 10% 16V	
C402	1-162-957-11	CERAMIC CHIP 220PF 5% 50V	
C403	1-162-964-11	CERAMIC CHIP 0.001uF 10% 50V	
C404	1-162-587-11	CERAMIC CHIP 0.039uF 10% 25V	
C405	1-164-633-11	CERAMIC CHIP 0.1uF 10% 25V	
C406	1-162-953-11	CERAMIC CHIP 100PF 5% 50V	
C407	1-162-638-11	CERAMIC CHIP 1uF 16V	
C410	1-162-974-11	CERAMIC CHIP 0.01uF 50V	
C411	1-162-638-11	CERAMIC CHIP 1uF 16V	
C412	1-126-205-11	ELECT CHIP 47uF 20% 6.3V	
C413	1-163-077-91	CERAMIC CHIP 0.1uF 50V	
C415	1-162-638-11	CERAMIC CHIP 1uF 16V	
C417	1-164-489-11	CERAMIC CHIP 0.22uF 10% 16V	
< CONNECTOR >			
CN400	1-580-057-11	PIN, CONNECTOR 4P	
< DIODE >			
D400	8-719-420-14	DIODE MA8082-M	
D401	8-719-420-14	DIODE MA8082-M	
< IC >			
IC400	8-759-822-37	IC LA7293M-TE-L (MIC AMP)	
IC401	8-749-923-29	IC RS-20E-T (REMOTE CONTROL RECEIVER)	
< JACK >			
J400	1-568-027-11	JACK, SMALL TYPE 1P (MIC PLUG IN POWER)	

Ref. No.	Part No.	Description	Remark
< COIL >			
L400	1-410-993-11	INDUCTOR CHIP 1uH	
L401	1-410-993-11	INDUCTOR CHIP 1uH	
< TRANSISTOR >			
Q400	8-729-230-60	TRANSISTOR 2SA1586-YG	
< RESISTOR >			
R400	1-216-822-11	METAL CHIP 1.2K 5% 1/16W	
R401	1-216-830-11	METAL CHIP 5.6K 5% 1/16W	
R402	1-216-838-11	METAL CHIP 27K 5% 1/16W	
R403	1-216-838-11	METAL CHIP 27K 5% 1/16W	
R405	1-216-864-11	METAL CHIP 0 5% 1/16W	
R407	1-216-831-11	METAL CHIP 6.8K 5% 1/16W	
R412	1-216-821-11	METAL CHIP 1K 5% 1/16W	
R414	1-216-864-11	METAL CHIP 0 5% 1/16W	
< FLEXIBLE BOARD >			
W400	1-650-348-11	FP-110 FLEXIBLE BOARD	

*	A-7072-059-A	PJ-65 BOARD, COMPLETE ***** (Ref. No. 5,000 Series)	
< CAPACITOR >			
C550	1-162-965-11	CERAMIC CHIP 0.0015uF 10% 50V	
C551	1-164-346-11	CERAMIC CHIP 1uF 16V	
C553	1-164-156-11	CERAMIC CHIP 0.1uF 25V	
< CONNECTOR >			
CN550	1-691-491-21	CONNECTOR, FFC/FPC 12P	
< DIODE >			
D551	8-719-404-46	DIODE MA110	
D552	8-719-404-46	DIODE MA110	
D553	8-719-110-03	DIODE RD7.5ES-B2	
D554	8-719-110-03	DIODE RD7.5ES-B2	
D556	8-719-110-03	DIODE RD7.5ES-B2	
D557	8-719-110-03	DIODE RD7.5ES-B2	
D559	8-719-404-46	DIODE MA110	
< JACK >			
J550	1-537-402-11	TERMINAL BOARD (VIDEO/AUDIO/RFU DC OUT)	
< RESISTOR >			
R552	1-216-864-11	METAL CHIP 0 5% 1/16W	

Ref. No.	Part No.	Description	Remark	Ref. No.	Part No.	Description	Remark
< SWITCH >				< CONNECTOR >			
S551	1-571-674-11	SWITCH, SLIDE (REMOTE COMMANDER ON/OFF)		C996	1-128-004-11	ELECT CHIP 10uF 20%	16V
*****				C998	1-128-530-11	ELECT CHIP 33uF 20%	10V
*****				C999	1-164-346-11	CERAMIC CHIP 1uF	16V
* A-7066-163-A PS-334 BOARD, COMPLETE				< DIODE >			
*****				CN950	1-691-542-21	CONNECTOR, BOARD TO BOARD 48P	
(Ref.No. 6,000 Series)				< FUSE >			
< CAPACITOR >				△F950	1-532-778-21	FUSE, MICRO (1.6A 125V)	
C950	1-164-633-11	CERAMIC CHIP 0.1uF 10%	25V	△F951	1-532-778-21	FUSE, MICRO (1.6A 125V)	
C951	1-164-384-11	CERAMIC CHIP 130PF 5%	50V	< IC >			
C952	1-162-965-11	CERAMIC CHIP 0.0015uF 10%	50V	IC950	8-759-060-94	IC MB3785APFV-G-BND-ER	
C953	1-162-965-11	CERAMIC CHIP 0.0015uF 10%	50V	(DC/DC CONVERTER, DRUM/CAPSTAN PWM DRIVE)			
C954	1-164-633-11	CERAMIC CHIP 0.1uF 10%	25V	< JACK >			
C957	1-164-227-11	CERAMIC CHIP 0.022uF 10%	25V	J950	1-537-281-11	TERMINAL BOARD (BATTERY)	
C958	1-162-965-11	CERAMIC CHIP 0.0015uF 10%	50V	J951	1-565-276-21	JACK, ULTRA SMALL 1P (REMOTE)	
C959	1-164-227-11	CERAMIC CHIP 0.022uF 10%	25V	< COIL >			
C960	1-164-730-11	CERAMIC CHIP 0.0012uF 5%	50V	L954	1-424-522-21	COIL, CHOKE 10uH	
C961	1-164-633-11	CERAMIC CHIP 0.1uF 10%	25V	L955	1-424-522-21	COIL, CHOKE 10uH	
C962	1-164-633-11	CERAMIC CHIP 0.1uF 10%	25V	L956	1-424-522-21	COIL, CHOKE 10uH	
C963	1-162-964-11	CERAMIC CHIP 0.001uF 10%	50V	L957	1-424-524-21	COIL, CHOKE 47uH	
C965	1-162-964-11	CERAMIC CHIP 0.001uF 10%	50V	L958	1-412-034-11	INDUCTOR CH 1P 330uH	
C966	1-162-964-11	CERAMIC CHIP 0.001uF 10%	50V	L959	1-412-034-11	INDUCTOR CHIP 330uH	
C968	1-162-964-11	CERAMIC CHIP 0.001uF 10%	50V	L960	1-412-027-11	INDUCTOR CHIP 2.2uH	
C969	1-162-957-11	CERAMIC CHIP 220PF 5%	50V	L961	1-412-029-11	INDUCTOR CHIP 10uH	
C970	1-162-963-11	CERAMIC CHIP 680PF 10%	50V	L962	1-412-029-11	INDUCTOR CHIP 10uH	
C971	1-162-928-11	CERAMIC CHIP 120PF 5%	50V	L963	1-412-028-11	INDUCTOR CHIP 4.7uH	
C972	1-162-928-11	CERAMIC CHIP 120PF 5%	50V	L964	1-424-524-21	COIL, CHOKE 47uH	
C973	1-128-530-11	ELECT CHIP 33uF 20%	10V	L965	1-424-524-21	COIL, CHOKE 47uH	
C974	1-128-004-11	ELECT CHIP 10uF 20%	16V	L966	1-410-369-11	INDUCTOR CHIP 1uH	
C975	1-127-558-11	ELECT(SOLID) 10uF 20%	10V	L967	1-410-369-11	INDUCTOR CHIP 1uH	
C976	1-128-004-11	ELECT CHIP 10uF 20%	16V	< TRANSISTOR >			
C977	1-127-558-11	ELECT(SOLID) 10uF 20%	10V	Q950	8-729-823-95	TRANSISTOR FC149	
C978	1-164-337-11	CERAMIC CHIP 2.2uF	16V	Q951	8-729-804-41	TRANSISTOR 2SB1122-S	
C979	1-164-337-11	CERAMIC CHIP 2.2uF	16V	Q952	8-729-823-84	TRANSISTOR FP102	
C980	1-164-337-11	CERAMIC CHIP 2.2uF	16V	Q953	8-729-823-82	TRANSISTOR FP101	
C981	1-164-337-11	CERAMIC CHIP 2.2uF	16V	Q954	8-729-823-82	TRANSISTOR FP101	
C982	1-127-558-11	ELECT(SOLID) 10uF 20%	10V	Q955	8-729-403-35	TRANSISTOR UN5113	
C983	1-164-337-11	CERAMIC CHIP 2.2uF	16V	Q957	8-729-011-26	TRANSISTOR 2SJ179	
C984	1-164-337-11	CERAMIC CHIP 2.2uF	16V				
C985	1-128-004-11	ELECT CHIP 10uF 20%	16V				
C986	1-127-558-11	ELECT(SOLID) 10uF 20%	10V				
C987	1-128-004-11	ELECT CHIP 10uF 20%	16V				
C988	1-127-559-11	ELECT(SOLID) 15uF 20%	6.3V				
C989	1-127-559-11	ELECT(SOLID) 15uF 20%	6.3V				
C992	1-128-004-11	ELECT CHIP 10uF 20%	16V				
C993	1-126-205-11	ELECT CHIP 47uF 20%	6.3V				
C994	1-162-970-11	CERAMIC CHIP 0.01uF 10%	25V				
C995	1-128-530-11	ELECT CHIP 33uF 20%	10V				

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Ref. No.	Part No.	Description	Remark	Ref. No.	Part No.	Description	Remark
Q958	8-729-420-12	TRANSISTOR	XN4213	*****			
Q959	8-729-019-91	TRANSISTOR	2SJ238				
Q960	8-729-402-81	TRANSISTOR	XN4501				
< RESISTOR >							
R950	1-216-837-11	METAL CHIP	22K 5% 1/16W	< CAPACITOR >			
R951	1-218-720-11	METAL CHIP	15K 0.50% 1/16W				
R952	1-216-842-11	METAL CHIP	56K 5% 1/16W	C500	1-135-259-11	TANTAL. CHIP	10uF 20% 6.3V
R953	1-216-837-11	METAL CHIP	22K 5% 1/16W	C503	1-164-337-11	CERAMIC CHIP	2.2uF 16V
R954	1-216-831-11	METAL CHIP	6.8K 5% 1/16W	C504	1-135-259-11	TANTAL. CHIP	10uF 20% 6.3V
R955	1-216-827-11	METAL CHIP	3.3K 5% 1/16W	C505	1-163-809-11	CERAMIC CHIP	0.047uF 10% 25V
R956	1-218-347-11	METAL GLAZE	91K 5% 1/16W	C506	1-162-968-11	CERAMIC CHIP	0.0047uF 10% 50V
R957	1-218-332-11	METAL GLAZE	130K 5% 1/16W				
R958	1-216-823-11	METAL CHIP	1.5K 5% 1/16W	C507	1-164-156-11	CERAMIC CHIP	0.1uF 25V
R959	1-218-720-11	METAL CHIP	15K 0.50% 1/16W	< CONNECTOR >			
R960	1-218-296-11	METAL CHIP	75K 0.50% 1/16W	CN501	1-691-473-21	CONNECTOR, FFC/FPC 7P	
R961	1-216-834-11	METAL CHIP	12K 5% 1/16W	CN502	1-691-472-21	CONNECTOR, FFC/FPC 6P	
R962	1-216-829-11	METAL CHIP	4.7K 5% 1/16W	CN503	1-691-482-21	CONNECTOR, FFC/FPC 15P	
R964	1-218-720-11	METAL CHIP	15K 0.50% 1/16W	< IC >			
R965	1-216-833-11	METAL CHIP	10K 5% 1/16W				
R966	1-218-706-11	METAL CHIP	3.9K 0.50% 1/16W	IC501	8-759-059-09	IC LB8111V (S/T REEL FG, D FG/PG AMP)	
R967	1-216-841-11	METAL CHIP	47K 5% 1/16W	< COIL >			
R968	1-216-832-11	METAL CHIP	8.2K 5% 1/16W				
R969	1-216-823-11	METAL CHIP	1.5K 5% 1/16W	L501	1-412-026-11	INDUCTOR CHIP 1uH	
R970	1-216-830-11	METAL CHIP	5.6K 5% 1/16W	< TRANSISTOR >			
R971	1-218-717-11	METAL CHIP	11K 0.50% 1/16W				
R972	1-216-845-11	METAL CHIP	100K 5% 1/16W	Q501	8-729-402-81	TRANSISTOR	XN4501
R973	1-216-829-11	METAL CHIP	4.7K 5% 1/16W	< RESISTOR >			
R974	1-216-829-11	METAL CHIP	4.7K 5% 1/16W				
R975	1-216-192-00	METAL CHIP	560 5% 1/8W	R501	1-216-840-11	METAL CHIP	39K 5% 1/16W
R976	1-216-182-00	METAL GLAZE	220 5% 1/8W	R504	1-216-864-11	METAL CHIP	0 5% 1/16W
R977	1-216-182-00	METAL GLAZE	220 5% 1/8W	R506	1-216-845-11	METAL CHIP	100K 5% 1/16W
R978	1-216-182-00	METAL GLAZE	220 5% 1/8W	R508	1-216-833-11	METAL CHIP	10K 5% 1/16W
R980	1-216-827-11	METAL CHIP	3.3K 5% 1/16W	R509	1-216-833-11	METAL CHIP	10K 5% 1/16W
R981	1-216-841-11	METAL CHIP	47K 5% 1/16W				
R982	1-216-845-11	METAL CHIP	100K 5% 1/16W	R510	1-216-833-11	METAL CHIP	10K 5% 1/16W
R983	1-216-821-11	METAL CHIP	1K 5% 1/16W	R511	1-216-833-11	METAL CHIP	10K 5% 1/16W
R984	1-218-722-11	METAL CHIP	18K 0.50% 1/16W	R512	1-216-845-11	METAL CHIP	100K 5% 1/16W
R985	1-218-883-11	METAL CHIP	33K 0.50% 1/16W	R514	1-216-845-11	METAL CHIP	100K 5% 1/16W
R986	1-216-845-11	METAL CHIP	100K 5% 1/16W	R517	1-216-174-00	METAL GLAZE	100 5% 1/8W
R987	1-216-833-11	METAL CHIP	10K 5% 1/16W	< FLEXIBLE BOARD >			
R988	1-216-864-11	METAL CHIP	0 5% 1/16W				
R989	1-216-820-11	METAL CHIP	820 5% 1/16W	W500	1-644-461-31	FP-600 BOARD 26P	
R991	1-216-864-11	METAL CHIP	0 5% 1/16W	W501	1-642-186-11	FP-437 FLEXIBLE BOARD 4P	
< TRANSFORMER >				*****			
△T950	1-450-874-21	TRANSFORMER, DC-DC CONVERTER (5CA)					
< VIBRATOR >							
X950	1-579-467-11	VIBRATOR, CERAMIC (475kHz)					

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SW-247**VA-88**

Ref.No.	Part No.	Description	Remark	Ref.No.	Part No.	Description	Remark
*	A-7072-058-A	SW-247 BOARD, COMPLETE ***** (Ref.No. 6,000 Series)		C106	1-162-947-11	CERAMIC CHIP 33PF 5% 50V	
		< CONNECTOR >		C107	1-162-965-11	CERAMIC CHIP 0.0015uF 10% 50V	
CN580	1-691-483-21	CONNECTOR, FFC/FPC 4P		C108	1-162-958-11	CERAMIC CHIP 270PF 5% 50V	
		< SWITCH >		C109	1-162-945-11	CERAMIC CHIP 22PF 5% 50V	
S580	1-692-111-11	SWITCH, KEY BOARD (START/STOP)		C112	1-164-227-11	CERAMIC CHIP 0.022uF 10% 25V	
S581	1-572-922-11	SWITCH, SLIDE (STANDBY ON/OFF)		C113	1-164-227-11	CERAMIC CHIP 0.022uF 10% 25V	
*****				C114	1-162-942-11	CERAMIC CHIP 12PF 5% 50V	
*	A-7066-165-A	VA-88 BOARD, COMPLETE (FX228/FX230) *****		C115	1-162-970-11	CERAMIC CHIP 0.01uF 10% 25V	
		< CAPACITOR >		C117	1-164-227-11	CERAMIC CHIP 0.022uF 10% 25V	
*	A-7066-199-A	VA-88 BOARD, COMPLETE (FX330) ***** (Ref.No. 2,000 Series)		C118	1-162-945-11	CERAMIC CHIP 22PF 5% 50V	
		< CAPACITOR >		C119	1-162-947-11	CERAMIC CHIP 33PF 5% 50V	
C052	1-162-638-11	CERAMIC CHIP 1uF 16V		C120	1-162-974-11	CERAMIC CHIP 0.01uF 50V	
C053	1-135-180-21	TANTALUM CHIP 3.3uF 20% 6.3V		C121	1-164-227-11	CERAMIC CHIP 0.022uF 10% 25V	
C054	1-162-974-11	CERAMIC CHIP 0.01uF 50V		C122	1-162-917-11	CERAMIC CHIP 15PF 5% 50V	
C055	1-162-974-11	CERAMIC CHIP 0.01uF 50V		C123	1-162-922-11	CERAMIC CHIP 39PF 5% 50V	
C056	1-135-180-21	TANTALUM CHIP 3.3uF 20% 6.3V		C124	1-164-218-11	CERAMIC CHIP 180PF 0.25PF 50V	
C057	1-162-974-11	CERAMIC CHIP 0.01uF 50V		C125	1-164-382-11	CERAMIC CHIP 91PF 5% 50V	
C058	1-135-180-21	TANTALUM CHIP 3.3uF 20% 6.3V		C126	1-162-923-11	CERAMIC CHIP 47PF 5% 50V	
C059	1-164-156-11	CERAMIC CHIP 0.1uF 25V		C128	1-164-156-11	CERAMIC CHIP 0.1uF 25V	
C060	1-135-259-11	TANTAL. CHIP 10uF 20% 6.3V		C201	1-162-959-11	CERAMIC CHIP 330PF 5% 50V	
C061	1-162-974-11	CERAMIC CHIP 0.01uF 50V		C202	1-162-957-11	CERAMIC CHIP 220PF 5% 50V	
C062	1-162-974-11	CERAMIC CHIP 0.01uF 50V		C203	1-164-005-11	CERAMIC CHIP 0.47uF 25V	
C064	1-162-949-11	CERAMIC CHIP 47PF 5% 50V		C204	1-128-004-11	ELECT CHIP 10uF 20% 16V	
C066	1-162-949-11	CERAMIC CHIP 47PF 5% 50V		C205	1-128-004-11	ELECT CHIP 10uF 20% 16V	
C070	1-162-947-11	CERAMIC CHIP 33PF 5% 50V		C206	1-162-974-11	CERAMIC CHIP 0.01uF 50V	
C071	1-128-003-11	ELECT CHIP 22uF 20% 4V		C207	1-162-974-11	CERAMIC CHIP 0.01uF 50V	
C072	1-162-974-11	CERAMIC CHIP 0.01uF 50V		C208	1-128-004-11	ELECT CHIP 10uF 20% 16V	
C073	1-162-974-11	CERAMIC CHIP 0.01uF 50V		C209	1-128-008-11	ELECT CHIP 3.3uF 20% 35V	
C074	1-128-004-11	ELECT CHIP 10uF 20% 16V		C210	1-162-974-11	CERAMIC CHIP 0.01uF 50V	
C075	1-162-974-11	CERAMIC CHIP 0.01uF 50V		C211	1-128-004-11	ELECT CHIP 10uF 20% 16V	
C077	1-128-004-11	ELECT CHIP 10uF 20% 16V		C212	1-128-008-11	ELECT CHIP 3.3uF 20% 35V	
C079	1-162-974-11	CERAMIC CHIP 0.01uF 50V (FX330)		C213	1-128-004-11	ELECT CHIP 10uF 20% 16V	
C092	1-162-974-11	CERAMIC CHIP 0.01uF 50V		C214	1-128-004-11	ELECT CHIP 10uF 20% 16V	
C093	1-164-337-11	CERAMIC CHIP 2.2uF 16V		C215	1-128-004-11	ELECT CHIP 10uF 20% 16V	
C095	1-162-974-11	CERAMIC CHIP 0.01uF 50V		C217	1-164-005-11	CERAMIC CHIP 0.47uF 25V	
C096	1-162-974-11	CERAMIC CHIP 0.01uF 50V		C218	1-128-004-11	ELECT CHIP 10uF 20% 16V	
C101	1-128-004-11	ELECT CHIP 10uF 20% 16V		C219	1-164-005-11	CERAMIC CHIP 0.47uF 25V	
C102	1-162-974-11	CERAMIC CHIP 0.01uF 50V		C224	1-164-222-11	CERAMIC CHIP 0.22uF 25V	
C103	1-162-974-11	CERAMIC CHIP 0.01uF 50V		C225	1-164-005-11	CERAMIC CHIP 0.47uF 25V	
C104	1-164-145-11	CERAMIC CHIP 390PF 5% 50V		C227	1-128-004-11	ELECT CHIP 10uF 20% 16V	
C105	1-162-974-11	CERAMIC CHIP 0.01uF 50V		C228	1-135-181-21	TANTALUM CHIP 4.7uF 20% 6.3V	
				C229	1-162-974-11	CERAMIC CHIP 0.01uF 50V	
				C230	1-126-246-11	ELECT CHIP 220uF 20% 4V	
				C231	1-128-004-11	ELECT CHIP 10uF 20% 16V	
				C232	1-162-967-11	CERAMIC CHIP 0.0033uF 10% 50V	
				C234	1-162-974-11	CERAMIC CHIP 0.01uF 50V	
				C235	1-128-004-11	ELECT CHIP 10uF 20% 16V	
				C238	1-126-607-11	ELECT CHIP 47uF 20% 4V	
				C239	1-162-960-11	CERAMIC CHIP 220PF 10% 50V	
				C240	1-128-004-11	ELECT CHIP 10uF 20% 16V	

Ref. No.	Part No.	Description		Remark	Ref. No.	Part No.	Description		Remark
C241	1-162-974-11	CERAMIC CHIP	0.01uF	50V	C331	1-164-156-11	CERAMIC CHIP	0.1uF	25V
C242	1-128-004-11	ELECT CHIP	10uF	20% 16V	C332	1-162-952-11	CERAMIC CHIP	82PF	5% 50V
C243	1-162-974-11	CERAMIC CHIP	0.01uF	50V	C333	1-162-968-11	CERAMIC CHIP	0.0047uF	10% 50V
C244	1-128-004-11	ELECT CHIP	10uF	20% 16V	C334	1-162-953-11	CERAMIC CHIP	100PF	5% 50V
C245	1-162-974-11	CERAMIC CHIP	0.01uF	50V	C335	1-162-974-11	CERAMIC CHIP	0.01uF	50V
C246	1-162-959-11	CERAMIC CHIP	330PF	5% 50V	C336	1-164-217-11	CERAMIC CHIP	150PF	5% 50V
C247	1-164-392-11	CERAMIC CHIP	390PF	5% 50V	C337	1-164-227-11	CERAMIC CHIP	0.022uF	10% 25V
C250	1-162-974-11	CERAMIC CHIP	0.01uF	50V	C338	1-162-974-11	CERAMIC CHIP	0.01uF	50V
C251	1-128-004-11	ELECT CHIP	10uF	20% 16V	C339	1-164-156-11	CERAMIC CHIP	0.1uF	25V
C252	1-162-948-11	CERAMIC CHIP	39PF	5% 50V	C400	1-124-778-00	ELECT CHIP	22uF	20% 6.3V
C253	1-162-949-11	CERAMIC CHIP	47PF	5% 50V	C403	1-162-957-11	CERAMIC CHIP	220PF	5% 50V
C258	1-162-955-11	CERAMIC CHIP	150PF	5% 50V	C404	1-126-205-11	ELECT CHIP	47uF	20% 6.3V
C260	1-128-004-11	ELECT CHIP	10uF	20% 16V	C406	1-164-346-11	CERAMIC CHIP	1uF	16V
C261	1-128-004-11	ELECT CHIP	10uF	20% 16V	C413	1-164-156-11	CERAMIC CHIP	0.1uF	25V
C271	1-162-948-11	CERAMIC CHIP	39PF	5% 50V	C414	1-164-677-11	CERAMIC CHIP	0.033uF	10% 16V
C273	1-162-949-11	CERAMIC CHIP	47PF	5% 50V	C416	1-162-974-11	CERAMIC CHIP	0.01uF	50V
C274	1-162-946-11	CERAMIC CHIP	27PF	5% 50V	C417	1-162-957-11	CERAMIC CHIP	220PF	5% 50V
C275	1-162-950-11	CERAMIC CHIP	56PF	5% 50V	C426	1-162-974-11	CERAMIC CHIP	0.01uF	50V
C276	1-162-953-11	CERAMIC CHIP	100PF	5% 50V	C427	1-163-809-11	CERAMIC CHIP	0.047uF	10% 25V
C280	1-128-004-11	ELECT CHIP	10uF	20% 16V	C428	1-126-607-11	ELECT CHIP	47uF	20% 4V
C291	1-162-974-11	CERAMIC CHIP	0.01uF	50V	C429	1-126-205-11	ELECT CHIP	47uF	20% 6.3V
C295	1-128-004-11	ELECT CHIP	10uF	20% 16V	C430	1-135-181-21	TANTALUM CHIP	4.7uF	20% 6.3V
C296	1-162-974-11	CERAMIC CHIP	0.01uF	50V	C431	1-162-951-11	CERAMIC CHIP	68PF	5% 50V
C303	1-128-004-11	ELECT CHIP	10uF	20% 16V	C432	1-164-346-11	CERAMIC CHIP	1uF	16V
C304	1-162-974-11	CERAMIC CHIP	0.01uF	50V	C434	1-164-346-11	CERAMIC CHIP	1uF	16V
C305	1-126-205-11	ELECT CHIP	47uF	20% 6.3V	C435	1-162-965-11	CERAMIC CHIP	0.0015uF	10% 50V
C306	1-162-926-11	CERAMIC CHIP	82PF	5% 50V	C436	1-162-974-11	CERAMIC CHIP	0.01uF	50V
C307	1-162-970-11	CERAMIC CHIP	0.01uF	10% 25V	C439	1-164-346-11	CERAMIC CHIP	1uF	16V
C308	1-162-959-11	CERAMIC CHIP	330PF	5% 50V	C440	1-162-949-11	CERAMIC CHIP	47PF	5% 50V
C309	1-128-013-11	ELECT CHIP	1uF	20% 50V	C442	1-162-957-11	CERAMIC CHIP	220PF	5% 50V
C310	1-128-013-11	ELECT CHIP	1uF	20% 50V	C444	1-128-006-11	ELECT CHIP	4.7uF	20% 25V
C311	1-126-192-11	ELECT	0.68uF	20% 50V	C446	1-128-013-11	ELECT CHIP	1uF	20% 50V
C312	1-164-227-11	CERAMIC CHIP	0.022uF	10% 25V	C448	1-128-004-11	ELECT CHIP	10uF	20% 16V
C313	1-163-035-00	CERAMIC CHIP	0.047uF	50V	C450	1-162-969-11	CERAMIC CHIP	0.0068uF	10% 25V
C314	1-128-004-11	ELECT CHIP	10uF	20% 16V	C453	1-162-977-11	CERAMIC CHIP	0.0018uF	10% 50V
C315	1-162-945-11	CERAMIC CHIP	22PF	5% 50V	C454	1-126-205-11	ELECT CHIP	47uF	20% 6.3V
C316	1-162-950-11	CERAMIC CHIP	56PF	5% 50V	C456	1-164-346-11	CERAMIC CHIP	1uF	16V
C318	1-162-974-11	CERAMIC CHIP	0.01uF	50V	C459	1-162-966-11	CERAMIC CHIP	0.0022uF	10% 50V
C319	1-162-937-11	CERAMIC CHIP	6PF	0.5PF 50V	C461	1-126-607-11	ELECT CHIP	47uF	20% 4V
C320	1-162-947-11	CERAMIC CHIP	33PF	5% 50V	C490	1-128-006-11	ELECT CHIP	4.7uF	20% 25V
C321	1-162-974-11	CERAMIC CHIP	0.01uF	50V	C494	1-128-006-11	ELECT CHIP	4.7uF	20% 25V
C322	1-162-974-11	CERAMIC CHIP	0.01uF	50V	C498	1-128-003-11	ELECT CHIP	22uF	20% 4V
C323	1-162-945-11	CERAMIC CHIP	22PF	5% 50V	C990	1-126-205-11	ELECT CHIP	47uF	20% 6.3V
C324	1-162-974-11	CERAMIC CHIP	0.01uF	50V	C991	1-162-974-11	CERAMIC CHIP	0.01uF	50V
C325	1-162-954-11	CERAMIC CHIP	120PF	5% 50V					
C326	1-162-951-11	CERAMIC CHIP	68PF	5% 50V					
C327	1-162-950-11	CERAMIC CHIP	56PF	5% 50V	CF301	1-579-370-11	FILTER, CERAMIC (4.32MHz)		
C328	1-162-957-11	CERAMIC CHIP	220PF	5% 50V					
C329	1-162-974-11	CERAMIC CHIP	0.01uF	50V					
C330	1-162-949-11	CERAMIC CHIP	47PF	5% 50V					
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Ref. No.	Part No.	Description	Remark	Ref. No.	Part No.	Description	Remark
CN202	1-691-476-21	CONNECTOR, BOARD TO BOARD 20P		L208	1-410-389-31	INDUCTOR CHIP 47uH	
CN400	1-691-487-21	CONNECTOR, FFC/FPC 8P		L213	1-410-385-11	INDUCTOR CHIP 22uH	
< DIODE >				L214	1-410-389-31	INDUCTOR CHIP 47uH	
D102	8-719-800-76	DIODE 1SS226		L215	1-410-390-11	INDUCTOR CHIP 56uH	
D201	8-719-027-50	DIODE MA142WK		L216	1-410-390-11	INDUCTOR CHIP 56uH	
D202	8-719-027-50	DIODE MA142WK		L301	1-410-385-11	INDUCTOR CHIP 22uH	
D203	8-719-027-48	DIODE MA142WA		L302	1-410-385-11	INDUCTOR CHIP 22uH	
D205	8-719-027-50	DIODE MA142WK		L303	1-410-393-11	INDUCTOR CHIP 100uH	
D206	8-719-027-50	DIODE MA142WK		L304	1-410-379-31	INDUCTOR CHIP 6.8uH	
D401	8-719-105-32	DIODE RD2.7M-B2		L305	1-410-393-11	INDUCTOR CHIP 100uH	
< FILTER >				L306	1-410-655-31	INDUCTOR CHIP 120uH	
FL051	1-236-757-21	FILTER, LOW PASS (C)		L307	1-410-656-11	INDUCTOR CHIP 150uH	
FL053	1-236-834-21	FILTER, LOW PASS		L308	1-410-393-11	INDUCTOR CHIP 100uH	
FL054	1-415-751-21	DELAY LINE, LC (YH)		L400	1-410-384-31	INDUCTOR CHIP 18uH	
FL301	1-236-575-11	B.P.F (PAL-M)		< TRANSISTOR >			
FL302	1-236-146-11	FILTER, BAND PASS		Q051	8-729-420-12	TRANSISTOR XN4213	
< IC >				Q052	8-729-141-48	TRANSISTOR 2SB624-BV345	
IC051	8-752-332-68	IC CXL5502M (1H DELAY (CCD)/4FSC PLL)		Q053	8-729-230-60	TRANSISTOR 2SA1586-YG	
IC052	8-759-710-29	IC NJM2235M (CHARACTER MIX)		Q055	8-729-010-75	TRANSISTOR MSC4116-B/C	
IC053	8-759-031-84	IC SCTS04F (INVERTER)		Q057	8-729-010-75	TRANSISTOR MSC4116-B/C	
IC054	8-752-053-21	IC CXA1211M (VCA)		Q060	8-729-010-75	TRANSISTOR MSC4116-B/C	
IC201	8-752-065-54	IC CXA1207AR (Y PROCESS)		Q061	8-729-010-75	TRANSISTOR MSC4116-B/C	
IC203	8-759-055-82	IC M62353GP (EVR D/A CONVERTER)		Q062	8-729-230-63	TRANSISTOR 2SC4116-YG (FX330)	
IC204	8-759-055-82	IC M62353GP (EVR D/A CONVERTER)		Q063	8-729-422-54	TRANSISTOR XN4215	
IC205	8-759-636-33	IC CXA1452		Q064	8-729-010-75	TRANSISTOR MSC4116-B/C	
		(CARRIER SET ADJ./DEVIATION ADJ.)		Q065	8-729-010-75	TRANSISTOR MSC4116-B/C	
IC206	8-752-053-21	IC CXA1211M (VCA)		Q066	8-729-230-60	TRANSISTOR 2SA1586-YG	
IC301	8-752-051-40	IC CXA1208R (CHROMA PROCESS)		Q067	8-729-420-53	TRANSISTOR UN5115	
IC400	8-759-234-77	IC TC4S66F (AUDIO I/O SWITCH)		Q103	8-729-010-75	TRANSISTOR MSC4116-B/C	
IC401	8-759-823-19	IC CXA1488RR (AFM AUDIO PROCESS)		Q104	8-729-010-75	TRANSISTOR MSC4116-B/C	
< COIL >				Q110	8-729-014-16	TRANSISTOR RN2302-TE85L	
L101	1-412-029-11	INDUCTOR CHIP 10uH		Q111	8-729-102-07	TRANSISTOR 2SC2223-F13	
L102	1-410-385-11	INDUCTOR CHIP 22uH		Q114	8-729-010-75	TRANSISTOR MSC4116-B/C	
L103	1-412-280-31	INDUCTOR 330uH		Q115	8-729-403-35	TRANSISTOR UN5113	
L104	1-410-167-41	INDUCTOR CHIP 820uH		Q118	8-729-420-12	TRANSISTOR XN4213	
L105	1-410-657-21	INDUCTOR CHIP 180uH		Q119	8-729-230-60	TRANSISTOR 2SA1586-YG	
L109	1-410-657-21	INDUCTOR CHIP 180uH		Q120	8-729-102-07	TRANSISTOR 2SC2223-F13	
L110	1-410-387-11	INDUCTOR CHIP 33uH		Q122	8-729-010-75	TRANSISTOR MSC4116-B/C	
L113	1-410-381-11	INDUCTOR CHIP 10uH		Q202	8-729-230-60	TRANSISTOR 2SA1586-YG	
L114	1-410-380-31	INDUCTOR CHIP 8.2uH		Q204	8-729-010-75	TRANSISTOR MSC4116-B/C	
L115	1-412-280-31	INDUCTOR 330uH		Q213	8-729-402-42	TRANSISTOR UN5213	
L116	1-410-655-31	INDUCTOR CHIP 120uH		Q214	8-729-101-07	TRANSISTOR 2SB798-DL	
L202	1-412-031-11	INDUCTOR CHIP 47uH		Q216	8-729-010-75	TRANSISTOR MSC4116-B/C	
L203	1-412-029-11	INDUCTOR CHIP 10uH		Q217	8-729-010-75	TRANSISTOR MSC4116-B/C	
L204	1-410-389-31	INDUCTOR CHIP 47uH		Q218	8-729-230-60	TRANSISTOR 2SA1586-YG	
L206	1-410-390-11	INDUCTOR CHIP 56uH		Q221	8-729-010-75	TRANSISTOR MSC4116-B/C	
				Q224	8-729-402-42	TRANSISTOR UN5213	
				Q225	8-729-402-42	TRANSISTOR UN5213	
				Q226	8-729-823-16	TRANSISTOR 2SC4555-5.6.7	
				Q227	8-729-420-12	TRANSISTOR XN4213	

Ref. No.	Part No.	Description	Remark	Ref. No.	Part No.	Description	Remark
Q228	8-729-010-75	TRANSISTOR	MSC4116-B/C	R101	1-216-837-11	METAL CHIP	22K 5% 1/16W
Q229	8-729-010-75	TRANSISTOR	MSC4116-B/C	R102	1-216-837-11	METAL CHIP	22K 5% 1/16W
Q230	8-729-230-60	TRANSISTOR	2SA1586-YG	R105	1-216-821-11	METAL CHIP	1K 5% 1/16W
Q231	8-729-115-28	TRANSISTOR	BN1L3Z-K	R106	1-216-821-11	METAL CHIP	1K 5% 1/16W
Q235	8-729-230-60	TRANSISTOR	2SA1586-YG	R107	1-216-811-11	METAL CHIP	150 5% 1/16W
Q302	8-729-402-81	TRANSISTOR	XN4501	R108	1-216-831-11	METAL CHIP	6.8K 5% 1/16W
Q306	8-729-010-75	TRANSISTOR	MSC4116-B/C	R109	1-216-835-11	METAL CHIP	15K 5% 1/16W
Q307	8-729-010-75	TRANSISTOR	MSC4116-B/C	R110	1-216-821-11	METAL CHIP	1K 5% 1/16W
Q308	8-729-230-60	TRANSISTOR	2SA1586-YG	R111	1-216-812-11	METAL CHIP	180 5% 1/16W
Q309	8-729-010-75	TRANSISTOR	MSC4116-B/C	R114	1-216-818-11	METAL CHIP	560 5% 1/16W
Q312	8-729-420-20	TRANSISTOR	XN4312	R125	1-216-823-11	METAL CHIP	1.5K 5% 1/16W
Q313	8-729-403-35	TRANSISTOR	UN5113	R126	1-216-820-11	METAL CHIP	820 5% 1/16W
Q314	8-729-010-75	TRANSISTOR	MSC4116-B/C	R127	1-216-834-11	METAL CHIP	12K 5% 1/16W
Q318	8-729-402-42	TRANSISTOR	UN5213	R128	1-216-833-11	METAL CHIP	10K 5% 1/16W
Q401	8-729-921-08	TRANSISTOR	DTC144TU	R129	1-216-817-11	METAL CHIP	470 5% 1/16W
Q402	8-729-402-42	TRANSISTOR	UN5213	R130	1-216-823-11	METAL CHIP	1.5K 5% 1/16W
Q990	8-729-101-07	TRANSISTOR	2SB798-DL	R131	1-216-824-11	METAL CHIP	1.8K 5% 1/16W
Q991	8-729-010-75	TRANSISTOR	MSC4116-B/C	R132	1-216-808-11	METAL CHIP	82 5% 1/16W
< RESISTOR >				R133	1-216-864-11	METAL CHIP	0 5% 1/16W
R051	1-216-833-11	METAL CHIP	10K 5% 1/16W	R137	1-216-821-11	METAL CHIP	1K 5% 1/16W
R052	1-216-841-11	METAL CHIP	47K 5% 1/16W	R140	1-216-836-11	METAL CHIP	18K 5% 1/16W
R053	1-216-827-11	METAL CHIP	3.3K 5% 1/16W	R141	1-216-836-11	METAL CHIP	18K 5% 1/16W
R054	1-216-857-11	METAL CHIP	1M 5% 1/16W	R142	1-216-821-11	METAL CHIP	1K 5% 1/16W
R055	1-216-821-11	METAL CHIP	1K 5% 1/16W	R143	1-216-864-11	METAL CHIP	0 5% 1/16W
R056	1-216-844-11	METAL CHIP	82K 5% 1/16W	R144	1-216-821-11	METAL CHIP	1K 5% 1/16W
R059	1-216-864-11	METAL CHIP	0 5% 1/16W	R147	1-216-827-11	METAL CHIP	3.3K 5% 1/16W
R060	1-216-864-11	METAL CHIP	0 5% 1/16W	R148	1-216-818-11	METAL CHIP	560 5% 1/16W
R061	1-216-864-11	METAL CHIP	0 5% 1/16W	R149	1-216-809-11	METAL CHIP	100 5% 1/16W
R062	1-216-839-11	METAL CHIP	33K 5% 1/16W	R150	1-216-817-11	METAL CHIP	470 5% 1/16W
R063	1-216-842-11	METAL CHIP	56K 5% 1/16W	R151	1-216-817-11	METAL CHIP	470 5% 1/16W
R064	1-216-817-11	METAL CHIP	470 5% 1/16W	R152	1-216-830-11	METAL CHIP	5.6K 5% 1/16W
R065	1-216-821-11	METAL CHIP	1K 5% 1/16W	R153	1-216-818-11	METAL CHIP	560 5% 1/16W
R068	1-216-821-11	METAL CHIP	1K 5% 1/16W	R154	1-216-818-11	METAL CHIP	560 5% 1/16W
R072	1-216-825-11	METAL CHIP	2.2K 5% 1/16W	R155	1-216-821-11	METAL CHIP	1K 5% 1/16W
R073	1-216-825-11	METAL CHIP	2.2K 5% 1/16W	R157	1-216-864-11	METAL CHIP	0 5% 1/16W
R074	1-216-821-11	METAL CHIP	1K 5% 1/16W	R158	1-216-817-11	METAL CHIP	470 5% 1/16W
R075	1-216-821-11	METAL CHIP	1K 5% 1/16W	R159	1-216-815-11	METAL CHIP	330 5% 1/16W
R079	1-216-825-11	METAL CHIP	2.2K 5% 1/16W	R201	1-216-820-11	METAL CHIP	820 5% 1/16W
R081	1-216-821-11	METAL CHIP	1K 5% 1/16W	R202	1-216-820-11	METAL CHIP	820 5% 1/16W
R082	1-216-825-11	METAL CHIP	2.2K 5% 1/16W	R203	1-216-837-11	METAL CHIP	22K 5% 1/16W
R083	1-216-821-11	METAL CHIP	1K 5% 1/16W	R204	1-216-864-11	METAL CHIP	0 5% 1/16W
R085	1-216-827-11	METAL CHIP	3.3K 5% 1/16W	R205	1-216-864-11	METAL CHIP	0 5% 1/16W
R086	1-216-827-11	METAL CHIP	3.3K 5% 1/16W	R207	1-216-824-11	METAL CHIP	1.8K 5% 1/16W
R088	1-216-847-11	METAL CHIP	150K 5% 1/16W	R210	1-216-864-11	METAL CHIP	0 5% 1/16W
R089	1-216-839-11	METAL CHIP	33K 5% 1/16W	R211	1-216-820-11	METAL CHIP	820 5% 1/16W
R090	1-216-838-11	METAL CHIP	27K 5% 1/16W	R212	1-216-821-11	METAL CHIP	1K 5% 1/16W
R091	1-216-829-11	METAL CHIP	4.7K 5% 1/16W	R213	1-216-804-11	METAL CHIP	39 5% 1/16W
R092	1-216-837-11	METAL CHIP	22K 5% 1/16W	R214	1-216-804-11	METAL CHIP	39 5% 1/16W
R093	1-216-839-11	METAL CHIP	33K 5% 1/16W	R215	1-216-807-11	METAL CHIP	68 5% 1/16W
				R216	1-218-740-11	METAL CHIP	100K 0.50% 1/16W

Ref. No.	Part No.	Description	Remark	Ref. No.	Part No.	Description	Remark
R217	1-216-853-11	METAL CHIP	470K 5% 1/16W	R299	1-216-825-11	METAL CHIP	2.2K 5% 1/16W
R220	1-216-818-11	METAL CHIP	560 5% 1/16W	R301	1-216-845-11	METAL CHIP	100K 5% 1/16W
R222	1-216-821-11	METAL CHIP	1K 5% 1/16W	R303	1-216-823-11	METAL CHIP	1.5K 5% 1/16W
R223	1-216-821-11	METAL CHIP	1K 5% 1/16W	R304	1-216-823-11	METAL CHIP	1.5K 5% 1/16W
R224	1-216-833-11	METAL CHIP	10K 5% 1/16W	R305	1-216-831-11	METAL CHIP	6.8K 5% 1/16W
R225	1-216-829-11	METAL CHIP	4.7K 5% 1/16W	R306	1-216-830-11	METAL CHIP	5.6K 5% 1/16W
R230	1-216-829-11	METAL CHIP	4.7K 5% 1/16W	R307	1-216-831-11	METAL CHIP	6.8K 5% 1/16W
R231	1-216-826-11	METAL CHIP	2.7K 5% 1/16W	R308	1-216-832-11	METAL CHIP	8.2K 5% 1/16W
R232	1-218-694-11	METAL CHIP	1.2K 0.50% 1/16W	R309	1-216-828-11	METAL CHIP	3.9K 5% 1/16W
R236	1-216-827-11	METAL CHIP	3.3K 5% 1/16W	R310	1-216-825-11	METAL CHIP	2.2K 5% 1/16W
R239	1-218-684-11	METAL CHIP	470 0.50% 1/16W	R311	1-216-817-11	METAL CHIP	470 5% 1/16W
R240	1-216-864-11	METAL CHIP	0 5% 1/16W	R312	1-216-827-11	METAL CHIP	3.3K 5% 1/16W
R246	1-216-833-11	METAL CHIP	10K 5% 1/16W	R313	1-216-825-11	METAL CHIP	2.2K 5% 1/16W
R247	1-216-833-11	METAL CHIP	10K 5% 1/16W	R318	1-216-837-11	METAL CHIP	22K 5% 1/16W
R248	1-216-833-11	METAL CHIP	10K 5% 1/16W	R319	1-216-831-11	METAL CHIP	6.8K 5% 1/16W
R249	1-216-813-11	METAL CHIP	220 5% 1/16W	R320	1-216-817-11	METAL CHIP	470 5% 1/16W
R250	1-216-841-11	METAL CHIP	47K 5% 1/16W	R321	1-216-822-11	METAL CHIP	1.2K 5% 1/16W
R251	1-216-822-11	METAL CHIP	1.2K 5% 1/16W	R322	1-216-825-11	METAL CHIP	2.2K 5% 1/16W
R252	1-216-828-11	METAL CHIP	3.9K 5% 1/16W	R323	1-216-822-11	METAL CHIP	1.2K 5% 1/16W
R253	1-216-821-11	METAL CHIP	1K 5% 1/16W	R324	1-216-821-11	METAL CHIP	1K 5% 1/16W
R254	1-216-864-11	METAL CHIP	0 5% 1/16W	R326	1-216-821-11	METAL CHIP	1K 5% 1/16W
R255	1-216-864-11	METAL CHIP	0 5% 1/16W	R327	1-216-823-11	METAL CHIP	1.5K 5% 1/16W
R256	1-216-295-00	METAL CHIP	0 5% 1/10W	R328	1-216-827-11	METAL CHIP	3.3K 5% 1/16W
R264	1-216-820-11	METAL CHIP	820 5% 1/16W	R329	1-216-822-11	METAL CHIP	1.2K 5% 1/16W
R265	1-216-821-11	METAL CHIP	1K 5% 1/16W	R330	1-216-818-11	METAL CHIP	560 5% 1/16W
R266	1-216-829-11	METAL CHIP	4.7K 5% 1/16W	R331	1-216-825-11	METAL CHIP	2.2K 5% 1/16W
R267	1-216-809-11	METAL CHIP	100 5% 1/16W	R332	1-216-818-11	METAL CHIP	560 5% 1/16W
R268	1-216-821-11	METAL CHIP	1K 5% 1/16W	R333	1-216-829-11	METAL CHIP	4.7K 5% 1/16W
R269	1-216-833-11	METAL CHIP	10K 5% 1/16W	R335	1-216-864-11	METAL CHIP	0 5% 1/16W
R270	1-216-824-11	METAL CHIP	1.8K 5% 1/16W	R336	1-216-864-11	METAL CHIP	0 5% 1/16W
R271	1-216-823-11	METAL CHIP	1.5K 5% 1/16W	R339	1-216-864-11	METAL CHIP	0 5% 1/16W
R272	1-216-825-11	METAL CHIP	2.2K 5% 1/16W	R340	1-216-825-11	METAL CHIP	2.2K 5% 1/16W
R273	1-216-817-11	METAL CHIP	470 5% 1/16W	R344	1-216-824-11	METAL CHIP	1.8K 5% 1/16W
R275	1-216-837-11	METAL CHIP	22K 5% 1/16W	R345	1-216-819-11	METAL CHIP	680 5% 1/16W
R276	1-216-817-11	METAL CHIP	470 5% 1/16W	R347	1-216-833-11	METAL CHIP	10K 5% 1/16W
R277	1-216-811-11	METAL CHIP	150 5% 1/16W	R348	1-216-840-11	METAL CHIP	39K 5% 1/16W
R279	1-216-810-11	METAL CHIP	120 5% 1/16W	R402	1-216-851-11	METAL CHIP	330K 5% 1/16W
R280	1-216-811-11	METAL CHIP	150 5% 1/16W	R403	1-216-837-11	METAL CHIP	22K 5% 1/16W
R281	1-216-825-11	METAL CHIP	2.2K 5% 1/16W	R404	1-216-849-11	METAL CHIP	220K 5% 1/16W
R282	1-216-820-11	METAL CHIP	820 5% 1/16W	R406	1-216-859-11	METAL GLAZE	1.5M 5% 1/16W
R283	1-216-820-11	METAL CHIP	820 5% 1/16W	R408	1-216-833-11	METAL CHIP	10K 5% 1/16W
R284	1-216-822-11	METAL CHIP	1.2K 5% 1/16W	R410	1-216-840-11	METAL CHIP	39K 5% 1/16W
R285	1-216-813-11	METAL CHIP	220 5% 1/16W	R412	1-216-835-11	METAL CHIP	15K 5% 1/16W
R286	1-216-818-11	METAL CHIP	560 5% 1/16W	R413	1-216-864-11	METAL CHIP	0 5% 1/16W
R287	1-216-817-11	METAL CHIP	470 5% 1/16W	R414	1-216-839-11	METAL CHIP	33K 5% 1/16W
R288	1-216-820-11	METAL CHIP	820 5% 1/16W	R415	1-216-864-11	METAL CHIP	0 5% 1/16W
R289	1-216-828-11	METAL CHIP	3.9K 5% 1/16W	R416	1-216-831-11	METAL CHIP	6.8K 5% 1/16W
R290	1-216-864-11	METAL CHIP	0 5% 1/16W	R417	1-216-839-11	METAL CHIP	33K 5% 1/16W
R296	1-216-833-11	METAL CHIP	10K 5% 1/16W	R419	1-216-840-11	METAL CHIP	39K 5% 1/16W
R298	1-216-829-11	METAL CHIP	4.7K 5% 1/16W	R421	1-216-839-11	METAL CHIP	33K 5% 1/16W

Ref.No.	Part No.	Description			Remark	Ref.No.	Part No.	Description			Remark
R424	1-216-833-11	METAL CHIP	10K	5%	1/16W	C509	1-126-090-11	ELECT	82uF	20%	10V
R429	1-216-821-11	METAL CHIP	1K	5%	1/16W	C510	1-164-611-11	CERAMIC CHIP	0.001uF	10%	500V
R470	1-216-808-11	METAL CHIP	82	5%	1/16W	C511	1-124-257-00	ELECT	2.2uF	20%	50V
R471	1-216-821-11	METAL CHIP	1K	5%	1/16W						
R472	1-216-841-11	METAL CHIP	47K	5%	1/16W	C512	1-163-037-11	CERAMIC CHIP	0.022uF	10%	25V
						C513	1-137-306-11	FILM CHIP	0.1uF	5%	16V
R473	1-216-849-11	METAL CHIP	220K	5%	1/16W	C514	1-162-638-11	CERAMIC CHIP	1uF		16V
R476	1-216-832-11	METAL CHIP	8.2K	5%	1/16W	C515	1-131-381-00	TANTALUM	47uF	10%	10V
R478	1-216-821-11	METAL CHIP	1K	5%	1/16W	C516	1-163-037-11	CERAMIC CHIP	0.022uF	10%	25V
R480	1-216-851-11	METAL CHIP	330K	5%	1/16W						
R481	1-216-849-11	METAL CHIP	220K	5%	1/16W	C517	1-135-091-91	TANTAL. CHIP	1uF	20%	16V
								< CONNECTOR >			
R950	1-216-825-11	METAL CHIP	2.2K	5%	1/16W	* CN501	1-566-762-11	PIN, CONNECTOR (PC BOARD)		7P	
R953	1-216-813-11	METAL CHIP	220	5%	1/16W	* CN502	1-566-195-11	PIN, CONNECTOR (PC BOARD)		2P	
R954	1-216-833-11	METAL CHIP	10K	5%	1/16W	* CN503	1-566-195-11	PIN, CONNECTOR (PC BOARD)		2P	
R955	1-216-833-11	METAL CHIP	10K	5%	1/16W						
R956	1-216-825-11	METAL CHIP	2.2K	5%	1/16W			< DIODE >			
R957	1-216-829-11	METAL CHIP	4.7K	5%	1/16W	D501	8-719-024-87	DIODE LN1261CAL (TALLY)			
R958	1-216-815-11	METAL CHIP	330	5%	1/16W	D502	8-719-024-87	DIODE LN1261CAL (TALLY)			
R960	1-216-817-11	METAL CHIP	470	5%	1/16W	D503	8-719-400-20	DIODE MA152WA			
R961	1-216-821-11	METAL CHIP	1K	5%	1/16W						
R962	1-216-815-11	METAL CHIP	330	5%	1/16W			< IC >			
R963	1-216-840-11	METAL CHIP	39K	5%	1/16W	IC501	8-759-420-01	IC AN2512S (H.V. OSC)			
R964	1-216-836-11	METAL CHIP	18K	5%	1/16W			< COIL >			
R965	1-216-821-11	METAL CHIP	1K	5%	1/16W						
R967	1-216-819-11	METAL CHIP	680	5%	1/16W (FX330)						
R968	1-216-816-11	METAL CHIP	390	5%	1/16W (FX330)						
R990	1-216-830-11	METAL CHIP	5.6K	5%	1/16W	L501	1-412-031-11	INDUCTOR CHIP 47uH			
R991	1-216-138-00	METAL CHIP	3.3	5%	1/8W	L502	1-410-385-11	INDUCTOR CHIP 22uH			
R992	1-216-295-00	METAL CHIP	0	5%	1/10W	△L503	1-460-220-11	COIL, FERRITE (HLC)			
R995	1-216-820-11	METAL CHIP	820	5%	1/16W			< TRANSISTOR >			
R996	1-216-836-11	METAL CHIP	18K	5%	1/16W	Q501	8-729-216-31	TRANSISTOR 2SA1163-G			
						Q502	8-729-120-28	TRANSISTOR 2SC1623-L5L6			
						Q503	8-729-106-68	TRANSISTOR 2SD1615A-GP			
								< RESISTOR >			
						R501	1-216-063-00	METAL CHIP	3.9K	5%	1/10W
						R502	1-216-059-00	METAL CHIP	2.7K	5%	1/10W
						R503	1-216-063-00	METAL CHIP	3.9K	5%	1/10W
						R504	1-216-041-00	METAL CHIP	470	5%	1/10W
						R505	1-216-041-00	METAL CHIP	470	5%	1/10W
						R506	1-216-073-00	METAL CHIP	10K	5%	1/10W
						R507	1-216-051-00	METAL CHIP	1.2K	5%	1/10W
						R508	1-216-005-00	METAL CHIP	15	5%	1/10W
						R509	1-216-870-11	METAL CHIP	180K	1%	1/10W
						R510	1-216-077-00	METAL CHIP	15K	5%	1/10W
						R511	1-216-129-00	METAL CHIP	2.2M	5%	1/10W
						R512	1-216-133-00	METAL CHIP	3.3M	5%	1/10W
						R513	1-216-125-00	METAL CHIP	1.5M	5%	1/10W
						R514	1-216-121-00	METAL CHIP	1M	5%	1/10W
						R515	1-216-055-00	METAL CHIP	1.8K	5%	1/10W

The components identified by mark Δ or dotted line with mark Δ are critical for safety.
Replace only with part number specified.

Les composants identifiés par une marque Δ sont critiques pour la sécurité.
Ne les remplacer que par une pièce portant le numéro spécifié.

VF-44

VF-51

Ref. No.	Part No.	Description	Remark	Ref. No.	Part No.	Description	Remark
R516	1-216-025-00	METAL CHIP	100 5% 1/10W	C517	1-135-091-91	TANTAL. CHIP 1uF 20% 16V	
R517	1-216-308-00	METAL CHIP	4.7 5% 1/10W			< CONNECTOR >	
R518	1-216-336-11	METAL CHIP	47K 1% 1/10W	* CN501	1-566-762-11	PIN, CONNECTOR (PC BOARD) 7P	
R519	1-216-099-00	METAL CHIP	120K 5% 1/10W	* CN502	1-566-195-11	PIN, CONNECTOR (PC BOARD) 2P	
R520	1-216-121-00	METAL CHIP	1M 5% 1/10W	* CN503	1-566-195-11	PIN, CONNECTOR (PC BOARD) 2P	
						< DIODE >	
R521	1-216-160-00	METAL GLAZE	27 5% 1/8W	D501	8-719-024-87	DIODE LN1261CAL (TALLY)	
R522	1-216-053-00	METAL CHIP	1.5K 5% 1/10W	D502	8-719-024-87	DIODE LN1261CAL (TALLY)	
R523	1-216-119-00	METAL CHIP	820K 5% 1/10W	D503	8-719-400-20	DIODE MA152WA	
R524	1-216-097-00	METAL CHIP	100K 5% 1/10W			< IC >	
R525	1-216-031-00	METAL CHIP	180 5% 1/10W	IC501	8-759-420-01	IC AN2512S (H. V. OSC)	
R526	1-216-748-11	METAL CHIP	39K 1% 1/10W			< COIL >	
		< VARIABLE RESISTOR >		L501	1-412-031-11	INDUCTOR CHIP 47uH	
RV501	1-238-088-11	RES, ADJ, CERMET 2.2K		L502	1-410-389-31	INDUCTOR CHIP 47uH	
RV502	1-223-565-11	RES, VAR, CARBON (4 TYPE)		△L503	1-402-725-11	COIL, FERRITE (HLC)	
RV503	1-238-096-11	RES, ADJ CERMET 1M				< TRANSISTOR >	
RV504	1-238-092-11	RES, ADJ, CERMET 47K		Q501	8-729-216-31	TRANSISTOR 2SA1163-G	
RV505	1-238-086-11	RES, ADJ, CERMET 470		Q502	8-729-120-28	TRANSISTOR 2SC1623-L5L6	
		< TRANSFORMER >		Q503	8-729-106-68	TRANSISTOR 2SD1615A-GP	
△T501	1-439-525-11	TRANSFORMER ASSY, FLYBACK		Q504	8-729-120-28	TRANSISTOR 2SC1623-L5L6	
		< THERMISTOR >				< RESISTOR >	
TH501	1-809-350-21	THERMISTOR, NTC (2125) 500Ω		R502	1-216-069-00	METAL CHIP 6.8K 5% 1/10W	
		< SOCKET >		R503	1-216-047-00	METAL CHIP 820 5% 1/10W	
W502	1-526-978-51	SOCKET ASSY, CRT 5P		R504	1-216-041-00	METAL CHIP 470 5% 1/10W	
		*****		R505	1-216-041-00	METAL CHIP 470 5% 1/10W	
*	A-7066-168-A	VF-51 BOARD, COMPLETE (TYPE B)		R506	1-216-675-11	METAL CHIP 10K 0.5% 1/10W	

		(FX228/FX230) (Ref. No. 9, 000 Series)		R507	1-218-150-11	METAL GLAZE 1.2K 1% 1/10W	
		< CAPACITOR >		R508	1-216-003-11	METAL GLAZE 12 5% 1/10W	
C501	1-163-109-00	CERAMIC CHIP 47PF 5% 50V		R509	1-216-101-00	METAL CHIP 150K 5% 1/10W	
C502	1-126-176-11	ELECT 220uF 20% 10V		R511	1-216-131-11	METAL CHIP 2.7M 5% 1/10W	
C503	1-163-077-91	CERAMIC CHIP 0.1uF 50V		R512	1-216-131-11	METAL CHIP 2.7M 5% 1/10W	
C504	1-163-009-11	CERAMIC CHIP 0.001uF 10% 50V					
△C505	1-164-713-11	CERAMIC CHIP 0.0056uF 5% 50V		R513	1-216-121-00	METAL CHIP 1M 5% 1/10W	
△C507	1-164-713-11	CERAMIC CHIP 0.0056uF 5% 50V		R514	1-216-121-00	METAL CHIP 1M 5% 1/10W	
C508	1-127-515-11	ELECT(SOLID) 47uF 20% 6.3V		R515	1-216-055-00	METAL CHIP 1.8K 5% 1/10W	
C509	1-124-577-11	ELECT 82uF 20% 10V		R516	1-216-025-00	METAL CHIP 100 5% 1/10W	
C510	1-164-611-11	CERAMIC CHIP 0.001uF 10% 500V		R517	1-216-308-00	METAL CHIP 4.7 5% 1/10W	
C511	1-124-257-00	ELECT 2.2uF 20% 50V					
C512	1-163-037-11	CERAMIC CHIP 0.022uF 10% 25V		R518	1-216-336-11	METAL CHIP 47K 1% 1/10W	
C513	1-137-306-11	FILM CHIP 0.1uF 5% 16V		R519	1-216-099-00	METAL CHIP 120K 5% 1/10W	
C514	1-164-337-11	CERAMIC CHIP 2.2uF 16V		R520	1-216-121-00	METAL CHIP 1M 5% 1/10W	
C515	1-131-381-00	TANTALUM 47uF 10% 10V		R521	1-216-160-00	METAL GLAZE 27 5% 1/8W	
C516	1-163-037-11	CERAMIC CHIP 0.022uF 10% 25V		R522	1-216-053-00	METAL CHIP 1.5K 5% 1/10W	
				R523	1-216-119-00	METAL CHIP 820K 5% 1/10W	
				R524	1-216-097-00	METAL CHIP 100K 5% 1/10W	
				R525	1-216-033-00	METAL CHIP 220 5% 1/10W	

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Les composants identifiés par une
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Ne les remplacer que par une pièce
portant le numéro spécifié.

Ref. No.	Part No.	Description				Remark	Ref. No.	Part No.	Description				Remark
R526	1-216-689-11	METAL CHIP	39K	0.5%	1/10W		C832	1-162-964-11	CERAMIC CHIP	0.001uF	10%	50V	
R527	1-216-689-11	METAL CHIP	39K	0.5%	1/10W		C833	1-164-361-11	CERAMIC CHIP	0.047uF		16V	
< VARIABLE RESISTOR >							C834	1-164-361-11	CERAMIC CHIP	0.047uF		16V	
RV501	1-238-088-11	RES, ADJ, CERMET 2.2K					C835	1-164-360-11	CERAMIC CHIP	0.1uF		16V	
RV503	1-238-561-11	RES, ADJ, METAL GLAZE 1M					C838	1-162-919-11	CERAMIC CHIP	22PF	5%	50V	
RV504	1-238-092-11	RES, ADJ, CERMET 47K					C839	1-162-974-11	CERAMIC CHIP	0.01uF		50V	
RV505	1-238-086-11	RES, ADJ, CERMET 470					C840	1-162-974-11	CERAMIC CHIP	0.01uF		50V	
< TRANSFORMER >							C842	1-162-974-11	CERAMIC CHIP	0.01uF		50V	
△T501	1-439-486-11	TRANSFORMER ASSY, FLYBACK					C844	1-162-974-11	CERAMIC CHIP	0.01uF		50V	
< THERMISTOR >							C845	1-162-974-11	CERAMIC CHIP	0.01uF		50V	
TH501	1-809-350-21	THERMISTOR, NTC (2125) 500Ω					C846	1-162-974-11	CERAMIC CHIP	0.01uF		50V	
< SOCKET >							C847	1-162-974-11	CERAMIC CHIP	0.01uF		50V	
W502	1-540-019-51	SOCKET ASSY, CRT					C848	1-162-974-11	CERAMIC CHIP	0.01uF		50V	
*****							C849	1-164-360-11	CERAMIC CHIP	0.1uF		16V	
*	A-7063-779-A	VF-68 BOARD, COMPLETE (FX330)					C850	1-164-360-11	CERAMIC CHIP	0.1uF		16V	
	*****						C851	1-164-360-11	CERAMIC CHIP	0.1uF		16V	
	(Ref. No. 8,000 Series)						C852	1-162-974-11	CERAMIC CHIP	0.01uF		50V	
< CAPACITOR >							C853	1-164-360-11	CERAMIC CHIP	0.1uF		16V	
C804	1-164-505-11	CERAMIC CHIP	2.2uF		16V		C862	1-162-974-11	CERAMIC CHIP	0.01uF		50V	
C805	1-135-091-91	TANTAL. CHIP	1uF	20%	16V		C863	1-162-974-11	CERAMIC CHIP	0.01uF		50V	
C806	1-135-259-11	TANTAL. CHIP	10uF	20%	6.3V		C864	1-135-179-21	TANTAL. CHIP	2.2uF	20%	16V	
C807	1-164-505-11	CERAMIC CHIP	2.2uF		16V		C865	1-162-974-11	CERAMIC CHIP	0.01uF		50V	
C808	1-135-145-11	TANTALUM CHIP	0.47uF	10%	35V		C866	1-162-921-11	CERAMIC CHIP	33PF	5%	50V	
C809	1-135-091-91	TANTAL. CHIP	1uF	20%	16V		C867	1-162-974-11	CERAMIC CHIP	0.01uF		50V	
C810	1-135-091-91	TANTAL. CHIP	1uF	20%	16V		C868	1-164-346-11	CERAMIC CHIP	1uF		16V	
C811	1-135-091-91	TANTAL. CHIP	1uF	20%	16V		C872	1-162-974-11	CERAMIC CHIP	0.01uF		50V	
C812	1-135-179-21	TANTAL. CHIP	2.2uF	20%	16V		C873	1-164-005-11	CERAMIC CHIP	0.47uF		25V	
C813	1-135-259-11	TANTAL. CHIP	10uF	20%	6.3V		< CONNECTOR >						
C814	1-135-259-11	TANTAL. CHIP	10uF	20%	6.3V		CN801	1-573-990-21	CONNECTOR, BOARD TO BOARD	10P			
C815	1-162-974-11	CERAMIC CHIP	0.01uF		50V		* CN802	1-573-356-11	CONNECTOR, FFC/FPC	16P			
C816	1-164-699-11	CERAMIC CHIP	0.0033uF	5%	50V		* CN803	1-573-351-11	CONNECTOR, FFC/FPC	11P			
C817	1-135-181-21	TANTALUM CHIP	4.7uF	20%	6.3V		< DIODE >						
C818	1-162-919-11	CERAMIC CHIP	22PF	5%	50V		D801	8-719-025-91	DIODE	MA365(E)			
C819	1-162-927-11	CERAMIC CHIP	100PF	5%	50V		< IC >						
C820	1-164-357-11	CERAMIC CHIP	1000PF	5%	50V		IC801	8-752-058-96	IC	CXA1585Q (RGB DECODER)			
C821	1-162-974-11	CERAMIC CHIP	0.01uF		50V		IC802	8-752-058-95	IC	CXA1515Q (LCD DRIVE)			
C822	1-164-156-11	CERAMIC CHIP	0.1uF		25V		IC803	8-752-362-78	IC	CXD2403R (LCD TIMING GENERATOR)			
C823	1-164-346-11	CERAMIC CHIP	1uF		16V		< COIL >						
C824	1-162-968-11	CERAMIC CHIP	0.0047uF	10%	50V		L801	1-414-078-11	INDUCTOR	10uH			
C825	1-162-919-11	CERAMIC CHIP	22PF	5%	50V		L803	1-414-078-11	INDUCTOR	10uH			
C828	1-162-919-11	CERAMIC CHIP	22PF	5%	50V		L805	1-412-962-11	INDUCTOR	82uH			
C829	1-162-919-11	CERAMIC CHIP	22PF	5%	50V		L806	1-412-962-11	INDUCTOR	82uH			
C830	1-162-919-11	CERAMIC CHIP	22PF	5%	50V		L807	1-412-962-11	INDUCTOR	82uH			
							L808	1-412-950-11	INDUCTOR	8.2uH			
							L809	1-412-962-11	INDUCTOR	82uH			
							L810	1-410-192-51	INDUCTOR CHIP	1uH			

The components identified by mark △ or dotted line with mark △ are critical for safety.
Replace only with part number specified.

Les composants identifiés par une marque △ sont critiques pour la sécurité.
Ne les remplacer que par une pièce portant le numéro spécifié.

VF-68**VF-69**

Ref. No.	Part No.	Description	Remark	Ref. No.	Part No.	Description	Remark
< TRANSISTOR >							
Q801	8-729-427-74	TRANSISTOR XP4601		R862	1-218-905-11	METAL CHIP 270K 0.50% 1/16W	
Q802	8-729-425-64	TRANSISTOR 2SD2216Q		R863	1-218-969-11	METAL GLAZE 22K 5% 1/16W	
< RESISTOR >				R864	1-218-981-11	METAL GLAZE 220K 5% 1/16W	
R801	1-218-958-11	METAL GLAZE 2.7K 5% 1/16W		R865	1-218-953-11	METAL GLAZE 1K 5% 1/16W	
R802	1-218-965-11	METAL GLAZE 10K 5% 1/16W		R866	1-218-952-11	METAL GLAZE 820 5% 1/16W	
R803	1-218-955-11	METAL GLAZE 1.5K 5% 1/16W					
R805	1-218-962-11	METAL GLAZE 5.6K 5% 1/16W		R867	1-218-967-11	METAL GLAZE 15K 5% 1/16W	
R806	1-218-965-11	METAL GLAZE 10K 5% 1/16W		R868	1-218-966-11	METAL GLAZE 12K 5% 1/16W	
R807	1-218-970-11	METAL GLAZE 27K 5% 1/16W		< VARIABLE RESISTOR >			
R808	1-218-965-11	METAL GLAZE 10K 5% 1/16W		RV802	1-241-480-11	RES, ADJ, CERMET 47K	
R809	1-218-953-11	METAL GLAZE 1K 5% 1/16W		RV803	1-241-480-11	RES, ADJ, CERMET 47K	
R810	1-218-969-11	METAL GLAZE 1K 5% 1/16W		RV804	1-241-480-11	RES, ADJ, CERMET 47K	
R811	1-218-953-11	METAL GLAZE 1K 5% 1/16W		< VIBRATOR >			
R812	1-218-966-11	METAL GLAZE 12K 5% 1/16W		X801	1-579-466-11	VIBRATOR, CRYSTAL (3.58MHz)	
R813	1-218-973-11	METAL GLAZE 47K 5% 1/16W		*****			
R814	1-218-989-11	METAL GLAZE 1M 5% 1/16W		△*	A-7063-780-A	VF-69 BOARD, COMPLETE (FX330)	
R815	1-218-969-11	METAL GLAZE 22K 5% 1/16W		*****			
R816	1-218-971-11	METAL GLAZE 33K 5% 1/16W		(Ref.No. 9,000 Series)			
R817	1-218-969-11	METAL GLAZE 22K 5% 1/16W		< CAPACITOR >			
R818	1-218-969-11	METAL GLAZE 22K 5% 1/16W		C951	1-135-181-21	TANTALUM CHIP 4.7uF 20% 6.3V	
R819	1-218-980-11	METAL GLAZE 180K 5% 1/16W		C954	1-164-346-11	CERAMIC CHIP 1uF 16V	
R820	1-218-970-11	METAL GLAZE 27K 5% 1/16W		C955	1-164-676-11	CERAMIC CHIP 2200PF 5% 16V	
R821	1-218-969-11	METAL GLAZE 22K 5% 1/16W		C957	1-162-967-11	CERAMIC CHIP 0.0033uF 10% 50V	
R822	1-218-969-11	METAL GLAZE 22K 5% 1/16W		C958	1-135-215-21	TANTAL. CHIP 6.8uF 20% 16V	
R823	1-218-971-11	METAL GLAZE 33K 5% 1/16W		C959	1-164-227-11	CERAMIC CHIP 0.022uF 10% 25V	
R824	1-218-990-11	METAL GLAZE 0 5% 1/16W		C960	1-164-227-11	CERAMIC CHIP 0.022uF 10% 25V	
R825	1-218-989-11	METAL GLAZE 1M 5% 1/16W		C961	1-164-505-11	CERAMIC CHIP 2.2uF 16V	
R826	1-218-965-11	METAL GLAZE 10K 5% 1/16W		C963	1-104-913-11	TANTAL. CHIP 10uF 20% 16V	
R827	1-218-971-11	METAL GLAZE 33K 5% 1/16W		C964	1-164-836-11	CERAMIC CHIP 6.8uF 16V	
R828	1-218-984-11	METAL GLAZE 390K 5% 1/16W		C966	1-165-128-11	CERAMIC CHIP 0.22uF 16V	
R829	1-218-984-11	METAL GLAZE 390K 5% 1/16W		C969	1-163-018-00	CERAMIC CHIP 0.0056uF 5% 50V	
R830	1-218-984-11	METAL GLAZE 390K 5% 1/16W		C970	1-163-018-00	CERAMIC CHIP 0.0056uF 5% 50V	
R831	1-218-944-11	METAL GLAZE 180 5% 1/16W		C971	1-163-038-00	CERAMIC CHIP 0.1uF 25V	
R833	1-218-969-11	METAL GLAZE 22K 5% 1/16W		C972	1-135-177-21	TANTALUM CHIP 1uF 20% 20V	
R834	1-218-971-11	METAL GLAZE 33K 5% 1/16W		C973	1-162-921-11	CERAMIC CHIP 33PF 5% 50V	
R835	1-218-969-11	METAL GLAZE 22K 5% 1/16W		C974	1-164-505-11	CERAMIC CHIP 2.2uF 16V	
R836	1-218-976-11	METAL GLAZE 82K 5% 1/16W		C975	1-135-201-11	TANTALUM CHIP 10uF 20% 4V	
R837	1-218-990-11	METAL GLAZE 0 5% 1/16W		C976	1-164-505-11	CERAMIC CHIP 2.2uF 16V	
R838	1-218-973-11	METAL GLAZE 47K 5% 1/16W		C977	1-164-505-11	CERAMIC CHIP 2.2uF 16V	
R839	1-218-990-11	METAL GLAZE 0 5% 1/16W		C978	1-164-505-11	CERAMIC CHIP 2.2uF 16V	
R840	1-218-973-11	METAL GLAZE 47K 5% 1/16W		C979	1-164-505-11	CERAMIC CHIP 2.2uF 16V	
R841	1-218-965-11	METAL GLAZE 10K 5% 1/16W		C980	1-164-505-11	CERAMIC CHIP 2.2uF 16V	
R842	1-218-953-11	METAL GLAZE 1K 5% 1/16W		C981	1-162-923-11	CERAMIC CHIP 47PF 5% 50V	
R843	1-218-971-11	METAL GLAZE 33K 5% 1/16W		< CONNECTOR >			
R849	1-218-965-11	METAL GLAZE 10K 5% 1/16W		CN951	1-580-789-21	PIN, CONNECTOR (SMD) 6P	
R850	1-216-835-11	METAL CHIP 15K 5% 1/16W		* CN953	1-573-351-11	CONNECTOR, FFC/FPC 11P	
R856	1-218-990-11	METAL GLAZE 0 5% 1/16W					
R861	1-218-873-11	METAL CHIP 12K 0.50% 1/16W					

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Ref. No.	Part No.	Description	Remark	Ref. No.	Part No.	Description	Remark
* CN955	1-580-267-11	CONNECTOR, BOARD TO BOARD 20P		R980	1-218-936-11	METAL GLAZE	39 5% 1/16W
	< DIODE >			R981	1-216-830-11	METAL CHIP	5.6K 5% 1/16W
D951	8-719-043-70	DIODE MA6S121-(TX)		R982	1-216-834-11	METAL CHIP	12K 5% 1/16W
D952	8-719-404-19	DIODE LN1251C		R983	1-216-835-11	METAL CHIP	15K 5% 1/16W
D954	8-719-802-36	DIODE 1SS250		R984	1-216-835-11	METAL CHIP	15K 5% 1/16W
D955	8-719-820-41	DIODE 1SS302		R985	1-216-833-11	METAL CHIP	10K 5% 1/16W
D956	8-719-027-45	DIODE MA740		R986	1-216-830-11	METAL CHIP	5.6K 5% 1/16W
D957	8-719-027-45	DIODE MA740		R987	1-216-295-00	METAL CHIP	0 5% 1/10W
D958	8-719-420-14	DIODE MA8082-M		R991	1-216-296-91	METAL GLAZE	0 5% 1/8W
D959	8-719-420-14	DIODE MA8082-M		R997	1-218-973-11	METAL GLAZE	47K 5% 1/16W
D960	8-719-420-14	DIODE MA8082-M		R998	1-218-977-11	METAL GLAZE	100K 5% 1/16W
	< IC >				< VARIABLE RESISTOR >		
IC951	8-759-097-75	IC MB3789PFV-G-BND (DC/AC CONVERTER)		RV951	1-241-480-11	RES, ADJ, CERMET 47K	
IC952	8-759-070-51	IC SN74HCU04ADB (CHARGE AMP)		RV953	1-230-523-11	RES, ADJ, METAL 10K	
IC954	8-759-998-98	IC LM358D (13.5V/12V REG)		RV954	1-230-523-11	RES, ADJ, METAL 10K	
	< COIL >			RV955	1-230-523-11	RES, ADJ, METAL 10K	
L951	1-414-080-11	INDUCTOR 22uH			< TRANSFORMER >		
L952	1-412-029-11	INDUCTOR CHIP 10uH		T951	1-423-813-11	TRANSFORMER, INVERTER	
L953	1-412-030-11	INDUCTOR CHIP 22uH			*****		
	< TRANSISTOR >			*	A-7072-057-A VK-37 BOARD, COMPLETE		
Q951	8-729-929-24	TRANSISTOR DTC143TE-TL			*****		
Q953	8-729-024-60	TRANSISTOR MTD6N15T4			(Ref. No. 7,000 Series)		
Q954	8-729-928-54	TRANSISTOR DTA123JE			< CONNECTOR >		
	< RESISTOR >			CN571	1-691-487-21	CONNECTOR, FFC/FPC 8P	
R951	1-218-971-11	METAL GLAZE	33K 5% 1/16W	CN574	1-691-483-21	CONNECTOR, FFC/FPC 4P	
R953	1-218-981-11	METAL GLAZE	220K 5% 1/16W	* CN575	1-580-055-21	PIN, CONNECTOR 2P	
R954	1-218-975-11	METAL GLAZE	68K 5% 1/16W		< DIODE >		
R957	1-218-973-11	METAL GLAZE	47K 5% 1/16W	D570	8-719-820-05	DIODE 1SS181	
R958	1-218-965-11	METAL GLAZE	10K 5% 1/16W		< SWITCH >		
R959	1-218-899-11	METAL CHIP	150K 0.50% 1/16W	S570	1-572-498-11	SWITCH, SLIDE (EJECT)	
R960	1-218-901-11	METAL CHIP	180K 0.50% 1/16W	S571	1-572-921-31	SWITCH, KEY BOARD (REW ◀▶)	
R961	1-218-982-11	METAL GLAZE	270K 5% 1/16W	S572	1-572-921-31	SWITCH, KEY BOARD (FF ▶▶)	
R962	1-218-973-11	METAL GLAZE	47K 5% 1/16W	S573	1-572-921-31	SWITCH, KEY BOARD (PB ▷)	
R963	1-218-970-11	METAL GLAZE	27K 5% 1/16W	S574	1-572-921-31	SWITCH, KEY BOARD (STOP □)	
R965	1-218-975-11	METAL GLAZE	68K 5% 1/16W	S576	1-572-921-31	SWITCH, KEY BOARD (PAUSE ■■)	
R966	1-218-973-11	METAL GLAZE	47K 5% 1/16W		< FLEXIBLE BOARD >		
R967	1-218-903-11	METAL CHIP	220K 0.50% 1/16W	W570	1-647-493-11	FP-5 FLEXIBLE BOARD 20P	
R968	1-218-899-11	METAL CHIP	150K 0.50% 1/16W	W573	1-650-349-11	FP-111 FLEXIBLE BOARD 8P	
R970	1-218-980-11	METAL GLAZE	180K 5% 1/16W		*****		
R971	1-218-970-11	METAL GLAZE	27K 5% 1/16W				
R973	1-216-833-11	METAL CHIP	10K 5% 1/16W				
R974	1-216-849-11	METAL CHIP	220K 5% 1/16W				
R975	1-216-846-11	METAL CHIP	120K 5% 1/16W				
R978	1-218-969-11	METAL GLAZE	22K 5% 1/16W				
R979	1-218-961-11	METAL GLAZE	4.7K 5% 1/16W				

Ref. No.	Part No.	Description	Remark
		MISCELLANEOUS *****	
11	1-550-743-11	HOLDER, BATTERY	
23	1-542-126-41	MICROPHONE UNIT	
31	1-690-604-11	CABLE, FLAT (FFC-33) 4P	
34	1-537-402-11	TERMINAL BOARD	
105	1-692-257-21	SWITCH, PUSH (ZOOM)	
112	1-642-187-11	FP-426 FLEXIBLE BOARD	
113	1-691-471-11	CONNECTOR, TRANSLATION 11P	
122	1-547-586-21	LENS, ZOOM (VCL-6110WE)	
124	1-547-558-21	FILTER BLOCK, OPTICAL	
△160	1-451-310-21	DEFLECTION YOKE (B/W) (TYPE A) (FX228/FX230)	
215	1-643-806-11	FP-539 FLEXIBLE BOARD (FX330)	
251	1-547-586-21	LENS, ZOOM (VCL-6110WE)	
801	A-7049-501-A	DRUM ASSY, UPPER (DGR-78-R)	
807	1-568-323-11	CONNECTOR, BOARD TO BOARD 4P	
871	1-641-643-12	FP-444 FLEXIBLE BOARD	
872	1-691-254-13	CONNECTOR, TRANSLATION 10P	
874	1-641-639-13	FP-442 FLEXIBLE BOARD	
875	1-645-271-11	FP-575 FLEXIBLE BOARD	
BL951	1-519-746-21	TUBE, FLUORESCENT (0.7 INCH) (FX330)	
D802	8-719-984-02	LED BR4371F (TALLY) (FX330)	
IC901	A-7030-368-A	CCD BLOCK ASSY (054 SERVICE) (CCD IMAGER)	
LCD901	8-753-011-00	LCX003BK-1 (FX330)	
M901	A-7048-564-A	DRUM ASSY (DGH-78A-R)	
M902	8-835-477-01	MOTOR, DC SCE-0101A (CAPSTAN)	
M903	A-7040-304-A	MOTOR BLOCK ASSY, LM (LOADING)	
M904	3-708-611-01	METER ASSY, IRIS	
M905	3-708-746-01	MOTOR ASSY, STEPPING (FOCUS)	
M906	3-708-609-11	MOTOR ASSY, ZOOM	
S001	1-572-986-11	SWITCH, ROTARY (ENCODER)	
S002	1-572-987-11	SWITCH, PUSH (3KEY) (REC PROOF, ME/MP, MP/MP-HG)	
S005	1-570-771-21	SWITCH (C DOWN)	
△V901	1-452-600-11	CRT ASSY (TYPE B) (FX228/FX230)	
△V901	1-546-091-11	CATHODE-RAY TUBE, B/W (TYPE A) (FX228/FX230)	
W400	1-650-348-11	FP-110 FLEXIBLE BOARD	
W500	1-644-461-31	FP-600 FLEXIBLE BOARD	
W501	1-642-186-11	FP-437 FLEXIBLE BOARD	
△W502	1-526-978-51	SOCKET ASSY, CRT (TYPE A) (FX228/FX230)	
△W502	1-540-019-51	SOCKET ASSY, CRT (TYPE B) (FX228/FX230)	
W561	1-690-602-11	CABLE, FLAT (FFC-23) 16P	
W570	1-647-493-11	FP-5 FLEXIBLE BOARD	
W573	1-650-349-11	FP-111 FLEXIBLE BOARD	

Ref. No.	Part No.	Description	Remark
ACCESSORIES & PACKING MATERIALS			

	1-467-574-21	REMOTE COMMANDER (RMT-708) (FX330)	
	1-574-039-11	CORD, CONNECTION	
		(A/V connecting cable (Monaural))(1.5m)	
	3-759-255-21	MANUAL, INSTRUCTION (ENGLISH)	
	3-759-255-31	MANUAL, INSTRUCTION (FRENCH) (FX230:CND)	
*	3-795-581-21	SAFEGUARD (SONY), IMPORTANT (US)	
*	3-947-112-01	CUSHION (LOWER)	
	3-947-969-31	BELT (S), SHOULDER	
*	3-948-354-01	CUSHION, ACC	
*	3-953-700-81	INDIVIDUAL CARTON (FX230)	
*	3-960-721-01	INDIVIDUAL CARTON (FX330)	
*	3-960-721-11	INDIVIDUAL CARTON (FX228)	
**	AC-V25/V25A/V25C	AC POWER ADAPTOR	
***	NP-55	BATTERY PACK	
Note			
**	MARK PARTS IS AVAILABLE FOR REPAIR SERVICE.		
***	MARK PARTS IS AVAILABLE AS AN OPTIONAL ACCESSORY.		

HARDWARE LIST			

#1	7-627-553-47	PRECISION SCREW +P 2X4 TYPE 3	

Be sure to read "Note on the CCD Imager replacement" on page 4-9 when changing the CCD imager.

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6-4. INTERFACE

6-4-1. System Control – Video/Audio Block Interface (CS-48 BOARD)

NAME	I/O	No.	VTR MODE				CAMERA MODE	
			STOP	FF	REW	PB	STAND BY	REC
SP/LP	O	IC503 ⑤③	*1	H	H	*2	H	H
VA PB MODE	O	IC503 ⑤⑦	L	L	L	H	L	L
AUDIO MUTE *3	O	IC503 ④⑧	L	L	L	L	L	L
VIDEO MUTE	O	IC503 ⑦②	*4	*4	*4	*5	L	L
CAM/LINE	O	IC503 ⑦⑨	L	L	L	L	H	H
JOG VD	O	IC503 ⑤	L	L	L	L	L	L
RP PB MODE	O	IC503 ③	H	H	H	H	H	L
FE ON	O	IC503 ④	H	H	H	H	H	L
RF SWP	O	IC503 ⑤⑨	L	*6	*6	*6	*6	*6
JOG	O	IC503 ⑥	L	L	L	L	L	L
VIDEO CS	O	IC508 ⑤⑩	V period "L" pulse					
VIDEO D/A CS	O	IC508 ④⑨	V period "H" pulse					
DATA TO MSTR	I	IC508 ④①	V period "L" pulse					
DATA TO SLVE	O	IC508 ④②	V period pulse train					
SCK	I	IC508 ④③	V period "H" pulse					
PB SP/LP	I	IC503 ⑥⑦	L	*7	*7	L	H	H
CLOG	I	IC503 ⑧④	H	*8	*8	*8	*8	H
VTR SYNC	I	IC503 ⑥⑤	*9	*9	*9	*9	*9	*9

*1. Outputs discrimination result of the mode just before.
"H": SP mode, "L": LP mode.

*2. Outputs discrimination result of the playback tape.
"H": SP mode, "L": LP mode.

*3. "H" during camera mode load/unload.

*4. "L" when external input (video) present.
"H" when other cases.

*5. "H" when tape no signal. "L" when other cases.

*6. 30 Hz duty 50% pulse (synchronized with drum rotation)

*7. "H": SP recording area on tape. "L": LP recording area.

*8. "H": no recording area or drop out area on tape.
Head clog detection input.

*9. Composite sync signal input separated from line input video signal, camera video signal or playback video signal.
(polarity +)

6-4-2. System Control – Servo Block Interface

NAME	I/O	No.	VTR MODE				CAMERA MODE	
			STOP	FF	REW	PB	STAND BY	REC
T.REEL FG	I	IC503 ⑥②	—	*1	*1	*1	—	*1
S.REEL FG	I	IC503 ⑥①	—	*1	*1	*1	—	*1
ATF ERROR	I	IC503 ⑥⑩	—	*2	*2	*2	*2	*2
DRUM PG	I	IC503 ⑥⑧	—	*3	*3	*3	*3	*3
DRUM FG	I	IC503 ⑥⑨	—	*4	*4	*4	*4	*4
CAP FG/CFG HMS	I	IC503 ⑦⑩, ⑦①	—	*5	*5	*5	*5	*5
CAP ON	O	IC503 ①	L	H	H	H	L	H
REF PILOT	O	IC503 ⑧⑤	*7	*8	*8	*8	*8	*8
RP PB MODE	O	IC503 ③	H	H	H	H	H	L
DRUM FWD/RVS *8	O	IC503 ⑤⑤	H	H	H	H	H	H
CAP FWD/RVS	O	IC503 ②	L	H	L	H	L	H
DRUM PWM	O	IC503 ⑦⑥	*9	*9	*9	*9	*9	*9
CAP PWM	O	IC503 ⑦⑤	L	*9	*9	*9	L	*9
LM LIM CONT *10	O	IC503 ③④	L	L	L	L	L	L
DRUM ON	O	IC503 ⑧③	L	H	H	H	H	H
DRUM BRK	O	IC503 ⑧②	L	L	L	L	L	L

*1. Inputting waveform which is similar to sine wave according to reel rotation.

*2. ATF error voltage input

*3. One PG pulse input per one drum rotation, approx. 30 Hz.

*4. 12 FG pulses input per one drum rotation, approx. 360 Hz.

*5. 520 FG pulses input per one capstan rotation.
Approx. 994 Hz when REC/PB (SP). 498 Hz when PB (LP).

*6. Four frequencies output synchronized with drum rotation.
f1=102.54 kHz, f2=118.95 kHz, f3=165.21 kHz and f4=148.69 kHz

*7. f2 (118.95 kHz) output

*8. Normally "H".
Temporary "L" when load (drum reverse rotation).

*9. 21.5 μ s period PWM signal

*10. Temporary "H" when cassette loading (finger catch protection).

1-2. CAMERA SYSTEM ADJUSTMENT

1. Power Supply Voltage Check (PS-334 board)

Subject	Option
Measuring instrument	Digital voltmeter
D5V check	
Measurement point	Pins ⑰ and ⑱ of CN950
Specified value	4.98 ± 0.15 Vdc
D4V check	
Measurement point	Pins ⑮ and ⑯ of CN950
Specified value	4.03 ± 0.15 Vdc
CAM 5V check	
Measurement point	Pins ⑬ and ⑭ of CN950
Specified value	4.90 ± 0.15 Vdc
15V check	
Measurement point	Pin ⑪ of CN950
Specified value	15.04 ± 0.4 Vdc
-9V check	
Measurement point	Pin ⑫ of CN950
Specified value	-8.5 ± 0.4 Vdc

Checking method:

- 1) Check that each power supply voltage satisfies the specified value.

2. Page F Data Initialization

Note: It is necessary to perform all adjustments of the camera section from the beginning again if the data of page F has been initialized.

Initializing method:

- 1) Release the protect.
Page: 6, address: 00, data: 01.
- 2) Check that the data of page: 6, address: 09 is 00.
(Display indicating that page F data can be initialized)
- 3) Set data: 1D to page: 6, address: 01, and press the PAUSE button of the adjusting remote control unit.
(Page F data initialization execution.
(The data of all addresses of page F will be initialized.))
- 4) Check that the data of page: 6, address: 09 is 01.
(Displays that the initialization of page F data has been completed)
- 5) Set data: 00 to page: 6, address: 01. and press the PAUSE button of the adjusting remote control unit.
(Releases the page F data initialization mode)
- 6) After performing "Page F data modification", perform all the adjustments of the camera section (page F).

3. Page F Data Modification

The data (initial data) that is automatically written on page F after the initialization of the page F data are different from the initial data for adjustment. Change the data by manual input, and arrange it.

Note: When changing the data, to write the data to the non-volatile memory, press the PAUSE button of the adjusting remote control unit every time the new data is set.

Address	Data
00 (ID)	6E
AE (NTSC PAL/H DEF DELAY)	24

[Distinguishing the Camera Micro Computer (IC709) Versions]

Each version can be distinguished by looking at the part name of the camera micro processor or the data of page: 6, address: 11.

Version	Part Name	Page: 6 Address: 11
Ver.1	CXP80624-455Q	01
Ver.5	CXP80624-299Q	05

4. 28 MHz Original Oscillation Adjustment (CS-48 board)

Adjust the 28 MHz oscillation of the synchronization clock.

If the oscillation is not 28 MHz, the period will be inaccurate or the image will not be in color.

Subject	Not required
Measurement Point	CL821 (pin ⑤ of IC801)
Measuring Instrument	Frequency counter
Adjusting Element	CT801
Specified Value	14318181 ± 71 Hz

Adjusting method:

- 1) Use CT801 to adjust the oscillation frequency to 14318181 ± 71 Hz.

5. V SUB Adjustment (CS-48 board)

Set the V SUB voltage of the CCD imager to the voltage set for each imager. If the correct voltage is not set, the high luminance subject exposed will be displayed blurred or rough.

Subject	Not required
Measurement Point	Pin ⑬ of CN701 (V SUB CHK)
Measuring Instrument	Digital voltmeter
Adjustment Page	F
Adjustment Address	04 (V SUB)
Specified Value	(Imager display voltage) ± 0.1 Vdc

Adjusting method:

- 1) Release the protect.
Page: 6, address: 00, data: 01
- 2) Change the data of page: F, address: 04, and adjust the voltage of pin ⑬ of CN701 to (imager display voltage) ± 0.1 Vdc.
- 3) Press the PAUSE button of the adjusting remote control unit.

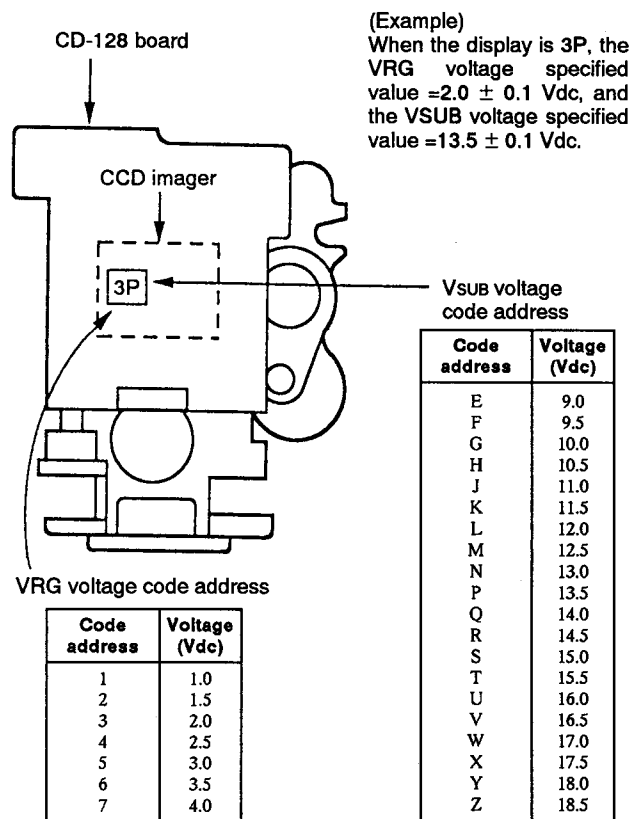


Fig. 7-1-7.

6. VRG Adjustment (CS-48 board)

Set the V RG voltage of the CCD imager to the voltage set for each imager. If the correct voltage is not set, the video level required for exposing low luminance subjects cannot be obtained. (The image will be dark.)

Subject	Not required
Measurement Point	Pin ⑮ of CN701 (PG CONT)
Measuring Instrument	Digital voltmeter
Adjustment Page	F
Adjustment Address	05 (VRG)
Specified Value	(Imager display voltage) ± 0.1 Vdc

Adjusting method:

- 1) Release the protect.
Page: 6, address: 00, data: 01
- 2) Change the data of page: F, address: 05, and adjust the voltage of pin ⑮ of CN701 to (imager display voltage) ± 0.1 Vdc.
- 3) Press the PAUSE button of the adjusting remote control unit.

7. CCD Imager Correction Data Write

Subject	Not required
Adjustment Page	F
Adjustment	1D to 2C (CCD-DEFECT)

Perform CCD imager correction data write in the following cases.

1. When the CCD imager has been replaced
2. The occasion of exchanging a camera micro processor or EEPROM (IC712).
3. When the page F data has been initialized

In the case of 1, as the correction data is not required for the CCD imager for repair, adjust all data of addresses 1D to 2C to "00".

In the case of 2 and 3, write the correction data attached to the shield case of PS-334 board to addresses 1D to 2C.

If the correction data are not attached, adjust all data of addresses 1D to 2C to "00".

Adjusting method:

- 1) Release the protect.
Page: 6, address: 00, data: 01
- 2) Write the correction data to page: F, addresses: 1D to 2C.

Note: To perform write to the non-volatile memory, press the PAUSE button of the adjusting remote control unit.

Processing after completing adjustments

- 1) If the CCD imager has been replaced, remove the old correction data label attached on the shield case (UPPER) of PS-334 board.

8. HALL Adjustment

To eliminate the differences in the outputs of the hall element, attached to iris for detecting the position of the lens iris, adjust the hall AMP gain and hall offset.

If these are not correct, the iris will oscillate or the indoor/outdoor white balance will be incorrect.

Subject	Not required
Measurement Point	DDS display of EVF or monitor TV
Measuring Instrument	
Adjustment Page	F
Adjustment Address	08 (HALL GAIN) 09 (HALL OFFSET)
Specified Value	31 to 35 during IRIS OPEN B1 to B5 during IRIS CLOSE

Adjusting method:

- Release the protect.
Page: 6, address: 00, data: 01
- Set data: 40 to page: F, address: AF, and press the PAUSE button of the adjusting remote control unit.
(HALL output display mode setting)
- Set data: 03 to page: 6, address: 01, and press the PAUSE button of the adjusting remote control unit.
- Set data: 40 to page: F, address: 08, and press the PAUSE button of the adjusting remote control unit.
- Read the DDS display data (the bottom two digits of the display data at the bottom right of the EVF or the monitor TV display), and set to W2.
- Set data: 30 to page: F, address: 08, and press the PAUSE button of the adjusting remote control unit.
- Read the DDS display data, and set to W1.
- Set data: 01 to page: 6, address: 01, and press the PAUSE button of the adjusting remote control unit.
(IRIS OPEN mode setting)
- Read the DDS display data, and set to K1.
- Set data: 40 to page: F, address: 08, and press the PAUSE button.
- Read the DDS display data, and set to K2.
- Convert W1, W2, K1, K2 to decimal notation, and obtain W1', W2', K1', K2'. (Refer to Table 7-1-4. "Hexadecimal notation-decimal notation conversion table".)
- Calculate X1' using the following equations (decimal notation calculation).

$$A' = W2' + K1' - W1' - K2' \dots \dots \dots \text{Equation 1}$$

$$B' = W1' - K1' \dots \dots \dots \text{Equation 2}$$

$$X1' = \frac{2048 + (48 \times A') - (16 \times B')}{A'} \dots \dots \dots \text{Equation 3}$$
- Convert X1' to hexadecimal notation, and obtain X1.
(Round off to one decimal place)
- Set data: X1 to page: F, address: 08, and press the PAUSE button of the adjusting remote control unit.
- Change the data of page: F, address: 09, and adjust the DDS display data to "33".
- Press the PAUSE button of the adjusting remote control unit.
- Set data: 03 to page: 6, address: 01, and press the PAUSE button of the adjusting remote control unit.
(IRIS CLOSE mode setting)

- Read the DDS display data, and set to W0. If W0 lies within the "B1" to "B5" range, perform "Processing after completing adjustments". If it lies outside the range, perform the following adjustments.
- Convert W0 to decimal notation, and obtain W0'.
- Calculate X2' using the following equations (decimal notation calculation).

$$C' = W0' - B' - 51 \dots \dots \dots \text{Equation 4}$$

$$X2' = \frac{(128 - B') \times (X1' - 48) + 48 \times C'}{C'} \dots \dots \dots \text{Equation 5}$$

(X1' and B' are values obtained from equations 2 and 3)
- Convert X2' to hexadecimal notation and obtain X2.
(Round off to one decimal place)
- Set data X2 to page: F, address: 08, and press the PAUSE button of the adjusting remote control unit.
- Change the data of page: F, address: 09, and adjust the DDS display data to "B3".
- Press the PAUSE button of the adjusting remote control unit.
- Set data: 01 to page: 6, address: 01, and press the PAUSE button of the adjusting remote control unit.
(IRIS OPEN mode setting)
- Check that the DDS display data lies within the "31" to "35" range.

Processing after Completing Adjustments

- Set data: 00 to page: 6, address: 01, and press the PAUSE button of the adjusting remote control unit.
(IRIS NORMAL mode setting)

9. Flange Back Adjustment

The flange back adjustment for the inner focus lens is performed automatically.

Subject	Chart for flange back adjustment (1000 ± 5 mm from the front side of the lens) Luminance: 300 ± 50 lux
Measurement Point	Check the operations on the TV monitor
Measuring Instrument	
Adjustment Page	
Adjustment Address	8A (STEP ZERO), 86 (WIDE LIMIT), 87 (WIDE LIMIT H), 88 (TELE LIMIT), 89 (TELE LIMIT H)

Adjusting method:

- 1) Check that the flange back adjustment chart center and the exposure display center coincide at both zoom lens TELE end and WIDE end.
- 2) Release the protect.
Page: 6, address: 00, data: 01
- 3) Check that the data of page: 6, address: 09 is 00.
(Flange back adjustment possible display)
- 4) Check that the page: F, address: 86 to 8A data is the initial value. (Refer to Table 7-1-2. "Page F address list".)
- 5) Set data: 01 to page: F, address: AC.
(This causes automatic adjustment to be performed.)
(Adjustments are performed at the zoom lens TELE end first, and then at the WIDE end. The adjustment data is automatically input to page: F, addresses: 86 to 8A.)
- 6) Check that the data of page: 6, address: 09 is 01.
(Display indicating flange back adjustment completion)

Processing after completing adjustments

- 1) Set data: 00 to page: F, address: AC.
- 2) Turn off the main power supply (6.3V).

10. Flange Back Check

Subject	Siemens star (1m from the front of the lens)
Measurement Point	DDS display of EVF or TV monitor
Measuring Instrument	
Specified Value	D2=D1 ± 5 D4=D3 ± 5

Checking method:

- 1) Set data: 11 to page: 6, address: 00. (Camera adjustment (Window ON) mode)
- 2) Set data: B0 to page: F, address: AF. (Focus step display mode)
- 3) Place the Siemens star 1m from the front of the lens.
- 4) To open the IRIS, decrease the luminous intensity to the Siemens star up to a point before noise appears on the image.

• Checking the flange back at the center point of the zoom.

- 5) Shoot the Siemens star with the zoom TELE end.
- 6) Turn off the auto-focus. (Note 1)
- 7) Adjust to the center point of the zoom.
(Adjust to the center point by viewing the EVF zoom position.)
- 8) Read the focus step value (4 digits) displayed on the TV monitor, and take the value as D1.
- 9) Turn on the auto-focus. (Note 2)
- 10) Read the focus step value here, and take the value as D2.
- 11) Check that $D2=D1 \pm 5$.

• Checking the flange back at the zoom WIDE end.

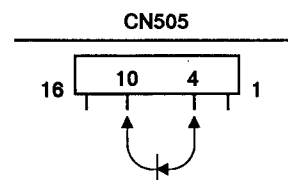
- 12) Shoot the Siemens star at the zoom TELE end.
- 13) Turn off the auto-focus. (Note 1)
- 14) Adjust to the zoom WIDE edge.
- 15) Read the focus step value displayed on the TV monitor, and taken the value as D3.
- 16) Turn on the auto-focus. (Note 2)
- 17) Read the focus step value here, and taken the value as D4.
- 18) Check that $D4=D3 \pm 5$.

Process after checking

- 1) Set data: 00 to page: F, address: AF, and press the PAUSE button of the adjusting remote control unit.
- 2) Turn off the main power supply (6.3V).

Note 1: How to turn off the auto focus.

- 1) Connect between Pin ⑩ (K OUT 5) and Pin ④ (K IN 6) of the CN505 on the CS-48 board with a diode (MA110 or a equivalent).



Note 2: How to turn on the auto focus.

- 1) Remove the diode connected in Note 1.

11. SYNC Level Adjustment (CS-48 board)

In order to set Y-signal output to the specified value, adjust Y-signal output gain of the CAMERA CORE (IC707).

Subject	Not required
Measurement Point	Pin ⑩ of CN701 (Y OUT)
Measuring Instrument	Oscilloscope
Adjustment Page	F
Adjustment Address	06 (VREF-Y)
Specified Value	$A=140 \pm 5 \text{ mV}$

Adjusting method:

- 1) Release the protect.
Page: 6, address: 00, data: 01
- 2) Set data: 05 to page: 6, address: 01, and press the PAUSE button of the adjusting remote control unit.
(IRIS CLOSE mode setting)
- 3) Change the data of page: F, address: 06, and adjust so that the SYNC level (A) becomes the specified value.
- 4) Press the PAUSE button of the adjusting remote control unit.

Processing after completing adjustments

- 1) Set data: 00 to page: 6, address: 01, and press the PAUSE button of the adjusting remote control unit.
(Release of IRIS CLOSE mode)

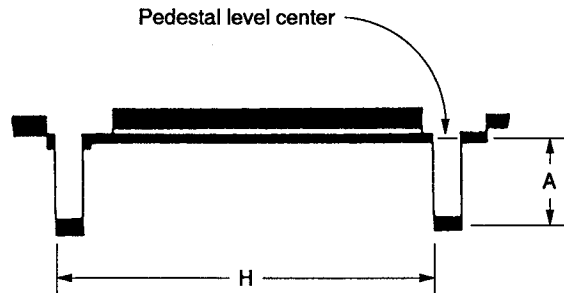


Fig. 7-1-8.

12. BURST Level Adjustment (CS-48 board)

In order to set CHROMA-signal output to the specified value, adjust CHROMA-signal output gain of the CAMERA CORE (IC707).

Subject	Not required
Measurement Point	Pin ⑩ of CN701 (C OUT)
Measuring Instrument	Oscilloscope
Adjustment Page	F
Adjustment Address	07 (VREF-C)
Specified Value	$A=140 \pm 5 \text{ mVp-p}$

Adjusting method:

- 1) Release the protect.
Page: 6, address: 00, data: 01
- 2) Set data: 05 to page: 6, address: 01, and press the PAUSE button of the adjusting remote control unit.
(IRIS CLOSE mode setting)
- 3) Change the data of page: F, address: 07, and adjust so that the burst level (A) becomes the specified value.
- 4) Press the PAUSE button of the adjusting remote control unit.

Processing after completing adjustments

- 1) Set data: 00 to page: 6, address: 01, and press the PAUSE button of the adjusting remote control unit.
(Release of IRIS CLOSE mode)

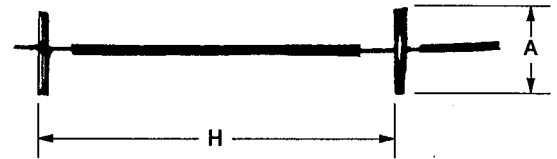


Fig. 7-1-9.

13. A/D Offset Adjustment

Adjust a pedestal level of A/D converter input signal to the correct level.

Subject	Not required
Measurement Point	DDS display on the EVF or the TV monitor
Measuring Instrument	
Adjustment Page	F
Adjustment Address	0C (AD REF)
Specified Value	40 to 41

Adjusting method:

- 1) Release the protect.
Page: 6, address: 00, data: 01
- 2) Set data: 05 to page: 6, address: 01, and press the PAUSE button of the adjusting remote control unit.
(IRIS CLOSE AGC MIN mode setting)
- 3) Set data: 00 to page: F, address: AF, and press the PAUSE button of the adjusting remote control unit.
(Y sampling output mode setting)
- 4) Set data: 00 to page: F, address: 16, and press the PAUSE button of the adjusting remote control unit.
(Sets the SET UP level to 0)
- 5) Set data: 35 to page: 1, address: E6.
(Setting 1 of the sampling position)
- 6) Set data: 6D to page: 1, address: E7.
(Setting 2 of the sampling position)
- 7) Change the data of page: F, address: 0C, and adjust the average value of the DDS display (the bottom two digits of the display data at the bottom right of the EVF or the TV monitor display) to 40 to 41.
(Set the data of address 0C to the maximum value)
(satisfying the specification.)
- 8) Press the PAUSE button of the adjusting remote control unit.

Processing after completing adjustments

- 1) Set data: 08 to page: F, address: 16, and press the PAUSE button of the adjusting remote control unit.
(Returns the SET UP level to the normal level.)
- 2) Turn the main power supply (6.3V) off.

14. Carrier Balance Adjustment

Adjust black balance.

Subject	Not required
Measurement Point	Video output terminal
Measuring Instrument	Vectorscope
Adjustment Page	F
Adjustment Address	03 (CS SL)
Specified Value	The center of the black luminance point should lie within the 1 ϕ circle whose center is the principle point.

Adjusting method:

- 1) Release the protect.
Page: 6, address: 00, data: 01.
- 2) Set data: 07 to page: 6, address: 01, and press the PAUSE button of the adjusting remote control unit.
(IRIS CLOSE, AGC MAX mode setting)
- 3) Change the data of page: F, address: 03, and adjust so that the center of the black luminance point coincides with the principle point.
- 4) Press the PAUSE button of the adjusting remote control unit.

Processing after completing adjustments

- 1) Set data: 00 to page: 6, address: 01, and press the PAUSE button of the adjusting remote control unit.
(IRIS NORMAL mode setting)

The center of the black luminance point should be within this circle

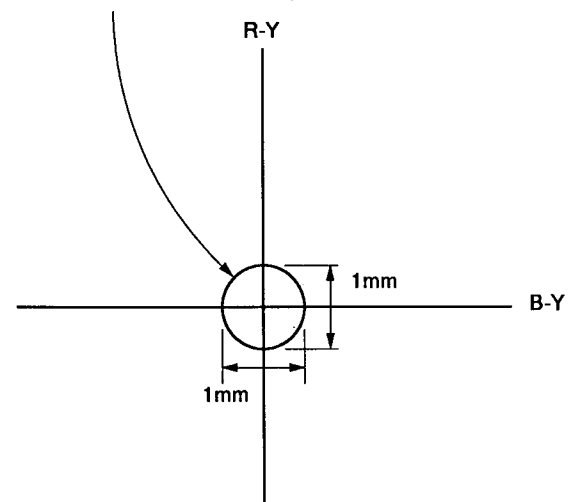


Fig. 7-1-10.

15. Picture Frame Setting

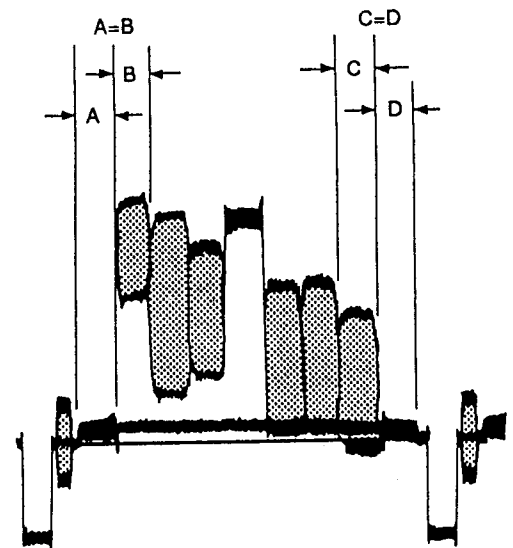
Subject	Color bar chart standard picture frame
Measurement Point	Video output terminal
Measuring Instrument	Oscilloscope and TV monitor.
Specified Value	$A=B, C=D, t=0 \pm 0.1 \text{ msec}$

Setting method:

- 1) Adjust the zoom and the camera direction, and set to the specified position.
- 2) Mark the position of the picture frame on the monitor display, and adjust the picture frame to this position in following adjustments using "color bar chart standard picture frame" and "white pattern standard picture frame".

Check on the oscilloscope

1. horizontal period



2. Vertical period

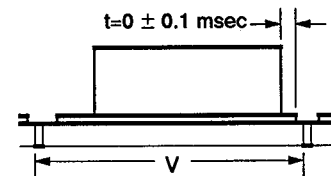


Fig. 7-1-11.

Check on the TV monitor

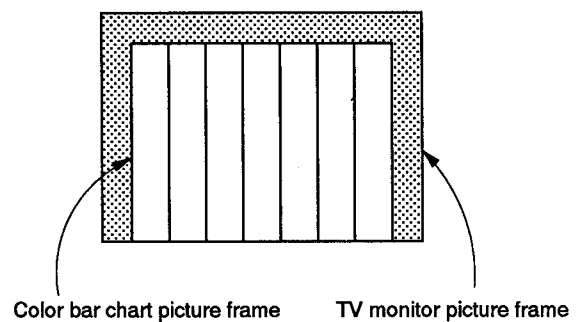


Fig. 7-1-12.

16. IRIS Level Adjustment (CS-48 board)

Set the standard operational signal level of CCD imager in the IRIS control range.

Subject	Color bar standard picture frame
Measurement Point	Pin ⑪ of CN701 (IRIS OUT)
Measuring Instrument	Oscilloscope
Adjustment Page	F
Adjustment Address	63 (AGC MIN)
Specified Value	$A=230 \pm 5 \text{ mV}$

Adjusting method:

- 1) Release the protect.
Page: 6, address: 00, data: 01
- 2) Change the data of page: F, address: 63, and adjust so that the IRIS OUT signal level (A) becomes the specified value.
- 3) Press the PAUSE button of the adjusting remote control unit.

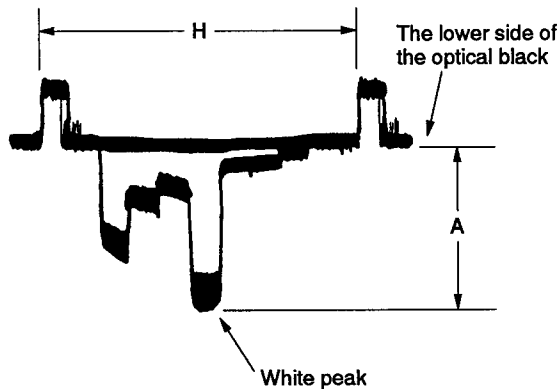


Fig. 7-1-13.

17. MAX GAIN Adjustment (CS-48 board)

Correct the differences in the minimum illuminance.

If the illuminance is not consistent, the image level required for taking subjects in low illuminance will not be produced (dark).

Subject	Color bar standard picture frame
Filter	ND filter 1.0 (2 sheets) and 0.4 (1 sheet), 0.1 (1 sheet)
Measurement Point	Pin ⑱ of CN701 (CAM Y)
Measuring Instrument	Oscilloscope
Adjustment Page	F
Adjustment Address	64 (AE MIN L)
Specified Value	$A=210 \pm 5 \text{ mV}$

Adjusting method:

- 1) Place the ND filter 2.5 (1.0+1.0+0.4+0.1) on the lens.
- 2) Release the protect.
Page: 6, address: 00, data: 01
- 2) Change the data of page: F, address: 64, and adjust so that the CAM Y signal level (A) becomes the specified value.
- 4) Press the PAUSE button of the adjusting remote control unit.

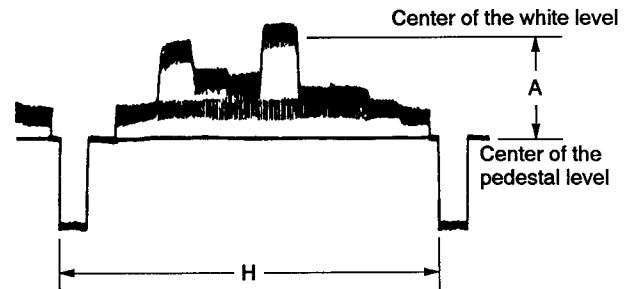


Fig. 7-1-14.

18. IRIS IN/OUT Adjustment

For the unit to judge if the white balance is indoors or outdoors in auto white balance operations, measure the light level and write it in the EEPROM. If the level is not correct, the white balance will not be accurate.

Subject	White pattern standard picture frame
Measurement Point	DDS display of the EVF or TV monitor
Measuring Instrument	monitor
Adjustment Page	F
Adjustment Address	39 (AWB IRIS IN) 3A (AWB IRIS OUT)

Adjusting method:

- 1) Set data: 11 to page: 6, address: 00.
(Camera adjustment mode (Window ON) setting)
- 2) Set data: 40 to page: F, address: AF, and press the PAUSE button of the adjusting remote control unit.
(HALL data display)
- 3) Set data: 0B to page: 6, address: 01, and press the PAUSE button of the adjusting remote control unit.
(ND0.8 shutter mode setting)
- 4) Read the DDS display data (the bottom two digits of the display data at the bottom right of the EVF or the TV monitor), and set to D39.
- 5) Set data: D39 to page: F, address: 39, and press the PAUSE button of the adjusting remote control unit.
- 6) Set data: 09 to page 6, address: 01, and press the PAUSE button of the adjusting remote control unit.
(ND0.5 shutter mode setting)
- 7) Read the DDS display data and set to D3A.
- 8) Set data: D3A to page: F, address: 3A, and press the PAUSE button of the adjusting remote control unit.

Processing after completing adjustments

- 1) Set data: 00 to page: 6, address: 01, and press the PAUSE button of the adjusting remote control unit.
(Release of the ND0.8 shutter mode)

19. Pre-white Balance Adjustment

Adjust white balance at the color temperature 3200K.

Subject	White pattern standard picture frame
Measurement Point	Video output terminal
Measuring Instrument	Vectorscope
Adjustment Page	F
Adjustment Address	33 (R CONT REF), 34 (B CONT REF)
Specified Value	The center of the white luminance point should lie within the circle with a diameter of 1mm and whose center is the principle point

Adjusting method:

- 1) Set data: 0F to page: 6, address: 01, and press the PAUSE button of the adjusting remote control unit.
(WB 3200K preset mode setting)
- 2) Set data: 11 to page: 6, address: 00.
(Camera adjustment mode (Window ON) setting)
- 3) Change the data of addresses:33 and 34 of page: F alternately, and coincide the white luminance point to the principle point.
Note: Be sure to press the PAUSE button of the adjusting remote control unit before changing the addresses.
If not, the new data will not written to the memory.
- 4) Press the PAUSE button of the adjusting remote control unit.

Processing after completing adjustments

- 1) Set data: 00 to page: 6, address: 01, and press the PAUSE button of the adjusting remote control unit.
(Release of the preset mode)
- 2) Set data: 10 to page: 6, address: 00.
(Protect mode setting)

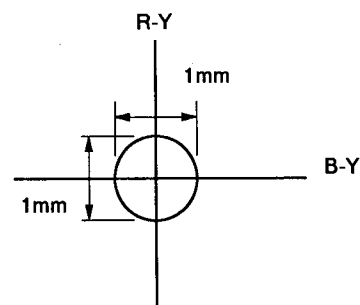


Fig. 7-1-15.

20. Color Reproduction Adjustment

Adjust the color separation matrix coefficient so that the proper color reproduction is produced.

If the coefficient is not correct, color reproducibility will be poor.

Subject	Color bar chart standard picture frame
Measurement Point	Video output terminal
Measuring Instrument	Vectorscope
Adjustment Page	F
Adjustment Address	18 (CORE B-Y GAIN), 19 (CORE R-Y GAIN), 1A (CORE R-Y HUE), 1B (CORE B-Y HUE)
Specified Value	All color luminance points should settle within each color reproduction frame.

Adjusting method:

- 1) Set data: 0F to page: 6, address: 01, and press the PAUSE button of the adjusting remote control unit.
(Indoor white balance mode setting)
- 2) Set data: 01 to page: 6, address: 00.
(Camera adjustment mode (Window OFF) setting)
- 3) Adjust the GAIN and PHASE of the vectorscope, and adjust the burst luminance point to the burst position of the color reproduction frame.
- 4) Change the data of addresses 18 to 1B of page: F, and settle each color luminance point in each color reproduction frame.

Note: Be sure to press the PAUSE button of the adjusting remote control unit before changing the addresses.
If not, the new data will not be written to the memory.

- 5) Press the PAUSE button of the adjusting remote control unit.

Processing after completing adjustments

- 1) Set data: 00 to page: 6, address: 01.
(Release of the adjustment mode)
- 2) Set data: 10 to page: 6, address: 00.
(Protect mode setting)

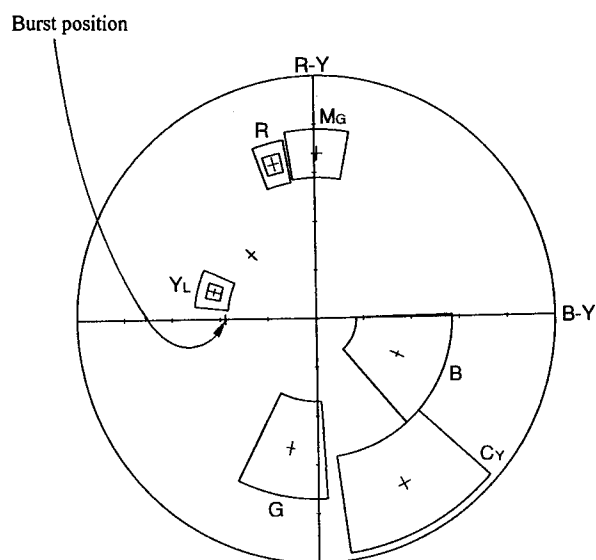


Fig. 7-1-16.

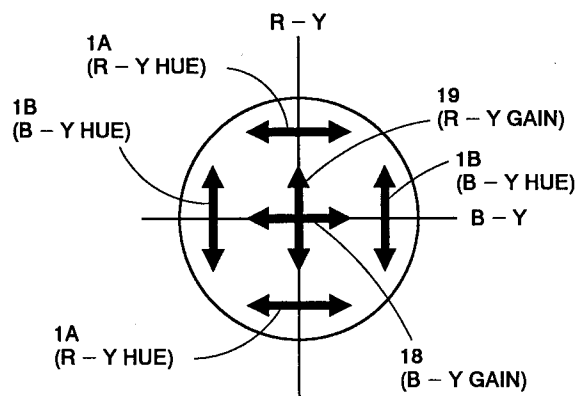


Fig. 7-1-17. Direction of the Movements of the Adjustment Address and Luminance Point

21. Auto White Balance Preset Adjustment

Subject	White pattern standard picture frame
Adjustment Page	F
Adjustment Address	2D (R REF L), 2E (R REF H), 2F (G REF L), 30 (G REF H), 31 (B REF L), 32 (B REF H)

Adjusting method:

- 1) Turn the power of the unit OFF/ON.
- 2) Check that the data of page: 6, address: 09 is 00.
(Auto white balance preset adjustment possible display)
- 3) Set data: 11 to page: 6, address: 00.
(Camera adjustment mode (Window ON) setting)
- 5) Set data: 11 to page: 6, address: 01, and press the PAUSE button of the adjusting remote control unit.
(3200K preset data take in preparation mode)
- 6) Set data: 0D to page: 6, address: 01, and press the PAUSE button of the adjusting remote control unit.
(When the 3200K preset data is taken in, the data will be automatically input to addresses 2D to 32 of page F.)
- 7) Check that the data of page: 6, address: 09 is 01.
(Auto white balance preset adjustment completion display)

Processing after completing adjustments

- 1) Set data: 00 to page: 6, address: 01, and press the PAUSE button of the adjusting remote control unit.
(Release of the auto white balance preset mode)
- 2) Set data: 10 to page: 6, address: 00.
(Release of camera adjustment mode)

22. Auto White Balance Adjustment

Adjust to the proper auto white balance output data.

If it is not correct, auto white balance and color reproducibility will be poor.

Subject	White pattern standard picture frame
Filter	Filter C14 for color temperature correction
Measurement Point	Check with the DDS display on the EVF or TV monitor
Measuring Instrument	
Adjustment Page	F
Adjustment Address	35 (AWB NORM R) 36 (AWB NORM B)
Specified Value	R ratio $2A80 \pm 40$ B ratio $5E80 \pm 40$

Note: Check that "Auto white balance preset adjustment" has been completed.

Adjusting method:

- 1) Set data: 11 to page: 6, address: 00.
(Camera adjustment mode (Window ON) setting)
- 2) Set data: D0 to page: F, address: 60, and press the PAUSE button of the adjusting remote control unit.
(Auto white balance adjustment mode setting)
- 3) Set data: 82 to page: F, address: AF.
(R ratio display mode setting)
- 4) Change the data of page: F, address: 35, and adjust the average value of the DDS display data (the display data at the bottom right of the EVF or the TV monitor) to $2A80 \pm 40$.
- 5) Press the PAUSE button of the adjusting remote control unit.
- 6) Set data: 83 to page: F, address: AF.
(B ratio display mode setting)
- 7) Change the data of page: F, address: 36, and adjust the average value of the DDS display data to $5E80 \pm 40$.
- 8) Press the PAUSE button of the adjusting remote control unit.

Processing after completing adjustments

- 1) Set data: 00 to page: F, address: 60, and press the PAUSE button of the adjusting remote control unit.
(Release of the white balance adjustment mode)
- 2) Set data: 10 to page: 6, address: 00.
(Release of camera adjustment mode)

23. White Balance Check

Subject	White pattern standard picture frame
Filter	Filter C14 for color temperature correction ND filter 1.0 and 0.3
Measurement Point	Video output terminal
Measuring Instrument	Vectorscope
Specified Value	Fig. 7-1-18. A to C

Checking method:

- 1) Check that the lens is not covered with either filter.
- 2) Set data: 11 to page: 6, address: 00.
(Camera adjustment mode (Window ON) setting)
- 3) Set data: 0F to page: 6, address: 01, and press the PAUSE button of the adjusting remote control unit.
(Indoor white balance mode setting)
- 4) Check that the center of the white luminance point is within the circle shown in Fig. 7-1-18.A.
(Indoor white balance check)
- 5) Set data: 00 to page: 6, address: 01, and press the PAUSE button of the adjusting remote control unit.
(Auto white balance mode setting)
- 6) Set data: 01 to page: F, address: 5C, and press the PAUSE button of the adjusting remote control unit.
(Auto white balance high speed tracking mode setting)
- 7) Set data: 91 to page: F, address: AF, and press the PAUSE button of the adjusting remote control unit.
(R, B ratio (M) display mode setting)
- 8) Check that the top 2 digits and the bottom 2 digits of the DDS display are 3D to 43.
- 9) Check that the center of the white luminance point is within the circle shown in Fig. 7-1-18. A.
- 10) Place the C14 filter on the lens.
- 11) Check that the center of the white luminance point settles in the circle shown in Fig. 7-1-18. B.
(Auto white balance outdoor mode check)
- 12) Remove the C14 filter, and place the ND filter 1.3 (1.0+0.3) on the lens.
- 13) Check that the center of the white luminance point settles in the circle shown in Fig. 7-1-18. C.
(Auto white balance outdoor mode check)

Processing after completing adjustments

- 1) Set data: 10 to page: F, address: 5C, and press the PAUSE button of the adjusting remote control unit.
(Release of the auto white balance fast tracking mode)
- 2) Set data: 00 to page: F, address: AF, and press the PAUSE button of the adjusting remote control unit.
(Release of the R, B ratio (M) display mode)
- 3) Set data: 10 to page: 6, address: 00.
(Release of camera adjustment mode)

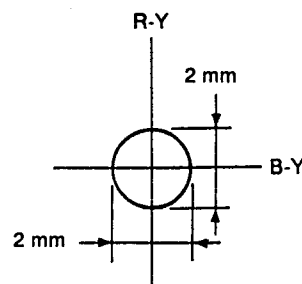


Fig. 7-1-18. A

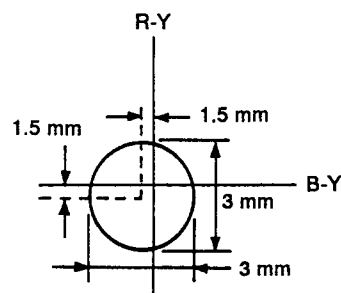


Fig. 7-1-18. B

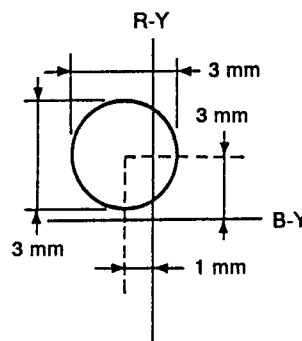


Fig. 7-1-18. C

24. Linear Matrix Adjustment

In order to compensate variation of the color re-appearing property due to characteristic variation of CCD imager, etc., adjust a corrective amount of linear matrix function.

Subject	Color bar standard picture frame
Filter	Filter C14 for color temperature correction
Measurement Point	DDS display on the EVF or TV monitor
Measuring Instrument	
Adjustment Page	F
Adjustment Address	3D (DMAT HUE) 3E (DMAT GAIN)

Note 1: Check that position that was set in the color bar chart picture frame "15. Picture Frame Setting" is maintained, before beginning adjustments.

Adjusting method:

- 1) Remove the filter C14 for color temperature correction.
- 2) Release the protect.
Page: 6, address: 00, data: 01
- 3) Color bar data sampling mode setting
 1. Check that the data of page: 6, address: 01 is 00.
 2. Set data: F1 to page: F, address: 60, and press the PAUSE button of the adjusting remote control unit.
 3. Set data: 2E to page: F, address: 14, and press the PAUSE button of the adjusting remote control unit.
(Check that the colors on the monitor display at the color modulation stop mode have disappeared)
- 4) Specifying the Yellow position
 1. Set data: C9 to page: 1, address: E6.
 2. Set data: B6 to page: 1, address: E7.
- 5) Set data: 03 to page: F, address: AF, and press the PAUSE button of the adjusting remote control unit.
(R-Y, B-Y data display mode setting)
- 6) Read the average value of the DDS display data (Note 2.), and set to Y1.
- 7) Specifying the Red position
 1. Set data: 59 to page: 1, address: E6.
 2. Set data: 6D to page: 1, address: E7.
- 8) Read the average value of the DDS display data (Note 3.), and set to R1.
- 9) Place the filter C14 for color temperature correction on the lens. (Ensure that the picture frame of the chart does not shift at this time.)
- 10) Specifying the yellow position.
 1. Set data: C9 to page: 1, address: E6.
 2. Set data: B6 to page: 1, address: E7.
- 11) Read the average value of the DDS display data (Note 2.), and set to Y2.
- 12) Convert Y1, R1, Y2 to decimal notation to obtain Y1', R1' and Y2'.
(Refer to Table 7-1-4. "Hexadecimal notation-decimal notation conversion table")
- 13) Calculate X1' from the following equation (decimal notation calculation).
 $X1' = Y2' - Y1'$

- 14) Calculate D3D from the following table
(D3D is hexadecimal notation)

X1' value	D3D
$-1 \leq X1' \leq 1$	F0
$X1' > 1$	F1
$X1' < -1$	FF

- 15) Set data: D3D to page: F, address: 3D, and press the PAUSE button of the adjusting remote control unit.
- 16) Specifying the Red position
 1. Set data: 59 to page: 1, address: E6.
 2. Set data: 6D to page: 1, address: E7.
- 17) Read the average value of the DDS display data (Note 3.), and set to R2.
- 18) Convert R2 to decimal notation to obtain R2'.
- 19) Calculate X2' from the following equation (decimal notation calculation).
 $X2' = R2' - R1'$
- 20) Calculate D3E from the following table.

X2' value	D3E
$X2' \geq 0$	00
$0 > X2' \geq -1$	01
$-1 > X2'$	02

- 21) Set data: D3E to page: F, address: 3E, and press the PAUSE button of the adjusting remote control unit.

Processing after completing adjustments

- 1) Set data: 00 to page: F, address: 60, and press the PAUSE button of the adjusting remote control unit.
(Release of the sampling mode)
- 2) Set data: 2C to page: F, address: 14, and press the PAUSE button of the adjusting remote control unit.
(Color modulation ON mode setting)
- 3) Set data: 00 to page: F, address: AF, and press the PAUSE button of the adjusting remote control unit.
(Release of the R-Y, B-Y data display mode)
- 4) Turn the main power supply (6.3V) off.

Note 2: The right two digits of the display data at the bottom right of the EVF or monitor TV.

Note 3: The left two digits of the display data at the bottom right of the EVF or monitor TV.

25. VIDEO OUT Level Check

Subject	Color bar chart standard picture frame
Measurement Point	Video output terminal (Terminated at $75\ \Omega$)
Measuring Instrument	Oscilloscope
Specified Value	Y level= 680 ± 40 mV SYNC level= 285 ± 20 mV BURST level= 280 ± 30 mV

Checking method:

- 1) Check that the Y level, SYNC level and BURST level satisfy the specified values.

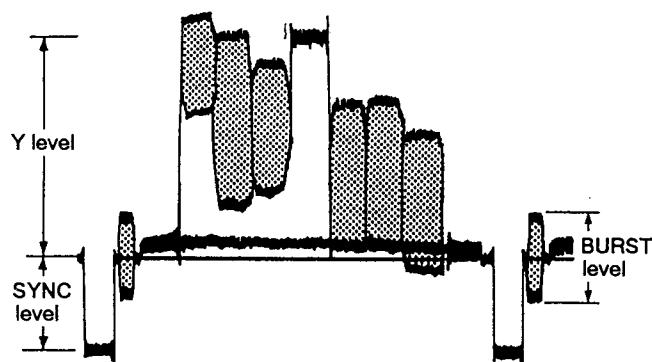


Fig. 7-1-19.

1-3. ELECTRONIC VIEWFINDER SYSTEM ADJUSTMENT (CCD-FX228/FX230, VF-44 BOARD)

1-3-1. Horizontal Tilt Adjustment

Mode	Playback
Signal	Alignment tape for checking operation (WR5-5NSP) Monoscope portion
Specified Value	See Fig. 7-1-21.

Adjustment method:

- 1) Adjust RV503 (BRIGHT) for appropriate brightness on CRT screen.
- 2) Loosen the DY (deflection yoke) tightening nut. (See Fig. 7-1-20.)
- 3) Make a picture horizontal by turning the DY.
- 4) Retighten the nut. (Do not tighten excessively.)

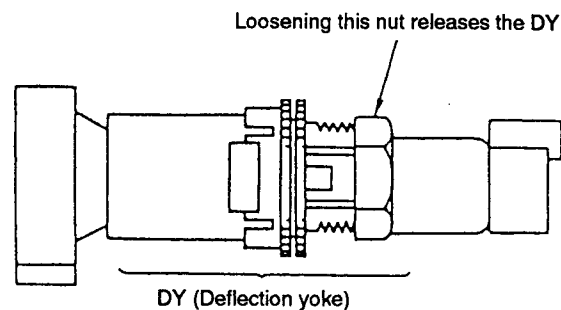
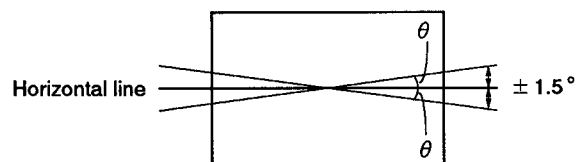


Fig. 7-1-20.



Specified value: Image orientation within $\pm 1.5^\circ$ of horizontal line.

Fig. 7-1-21.

1-3-2. Centering Adjustment

Mode	Playback
Signal	Alignment tape for checking operation (WR5-5NSP) Monoscope portion
Specified Value	See Fig. 7-1-23.

Adjustment method:

- 1) Turn the centering adjustment rings to provide an image with even right, left, upper and lower margins. (See Fig. 7-1-22.)

Note: Since the centering position is affected by the earth magnetism, turn the equipment over 360° horizontally, and make adjustments at the orientation which exhibits median displacements of the image.

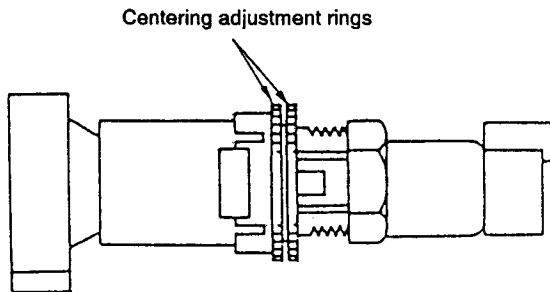


Fig. 7-1-22.

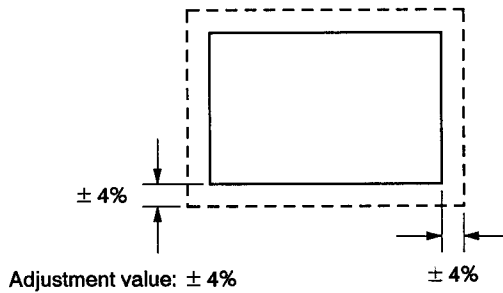


Fig. 7-1-23.

1-3-3. AFC Adjustment (VF-44 Board)

Mode	E-E or Camera standby
Signal	Color bar
Measurement Point	C517 ⊕ side
Measuring Instrument	Digital voltmeter or oscilloscope (DC range)
Adjustment Element	RV504 (AFC)
Specified Value	2.70 ± 0.15 Vdc

Adjustment method:

- 1) Adjust RV504 (AFC) for 2.70 ± 0.15 Vdc.

1-3-4. Horizontal Amplitude Adjustment (VF-44 Board)

Mode	Playback
Signal	Alignment tape for checking operation (WR5-5NSP) Monoscope portion
Adjustment Element	C504
Specified Value	6 ± 3.5%

Adjustment method:

- 1) Line up the upper and lower sections of the monoscope image with the upper and lower edges of the screen by RV505 (V SIZE).
- 2) Rotate RV503 (BRiGHT) to set the brightness to the normal level.
- 3) Short or open the pattern **A** of the H size adjustment capacitor (C504) to provide horizontal overscans of 6 ± 3.5% (total of left and right). (See Fig. 7-1-25.)

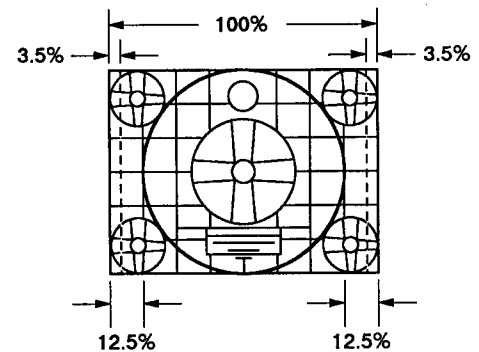
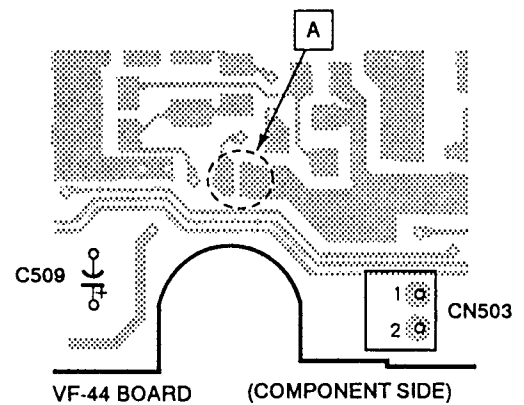


Fig. 7-1-24.



A section	H size
Short	Large
Open	Small

Fig. 7-1-25.

1-3-5. Vertical Amplitude Adjustment (VF-44 Board)

Mode	Playback
Signal	Alignment tape for checking operation (WR5-5NSP) Monoscope portion
Adjustment Element	RV505 (V SIZE)
Specified Value	$6 \pm 3.5\%$

Adjustment method:

- 1) By turning RV505 (V SIZE), adjust vertical overscan to $6 \pm 3.5\%$ (upper and lower total).

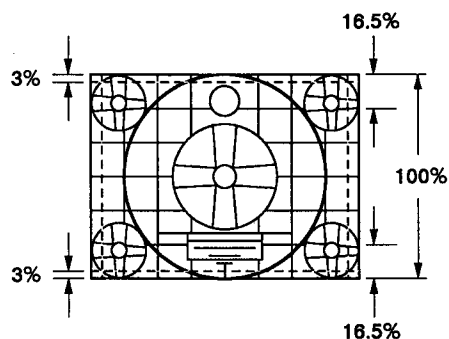


Fig. 7-1-26.

1-3-6. Focus Adjustment (VF-44 Board)

Mode	Playback
Signal	Alignment tape for checking operation (WR5-5NSP) Monoscope portion
Adjustment Element	RV502 (FOCUS)

Adjustment method:

- 1) Adjust to the best focus point with RV502.

1-3-7. Brightness, Contrast Adjustments (VF-44 Board)

Mode	Playback
Signal	Alignment tape for checking operation (WR5-5NSP) Monoscope portion
Adjustment Element	Brightness: RV503 (BRIGHT) Contrast: RV501 (CONT)

Adjustment method:

- 1) Adjust RV503 (BRIGHT) and RV501 (CONT) alternately until the bright and dark areas of a gray scale are displayed correctly. (The bright areas should not be made too bright to avoid a fuzzy display of the cross-hatches in the monoscope circle, and the brightness of the dark areas should be such that discrimination between the darkest and second darkest area is possible.)

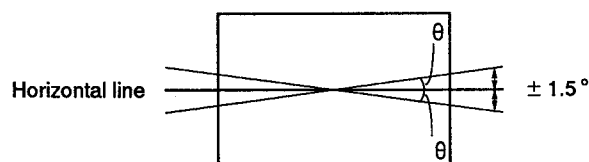
1-4. ELECTRONIC VIEWFINDER SYSTEM ADJUSTMENTS (CCD-FX228/FX230, VF-51 BOARD)

1-4-1. Horizontal Slant Adjustment

Model	Playback
Signal	Alignment tape: For checking operations (WR5-5NSP) Monoscope section
Specified Value	$\pm 1.5^\circ$

Adjusting method:

- 1) Adjust RV503 (BRIGHT) so that the CRT can be seen easily and clearly.
- 2) Loosen the DY (deflection yoke) tightening screw.
- 3) Rotate DY, and adjust the image so that it is horizontal.
- 4) Tighten the DY tightening nut.
(Do not tighten it too tightly.)



Specified value: The image should be within $\pm 1.5^\circ$ of the horizontal line.

Fig. 7-1-27.

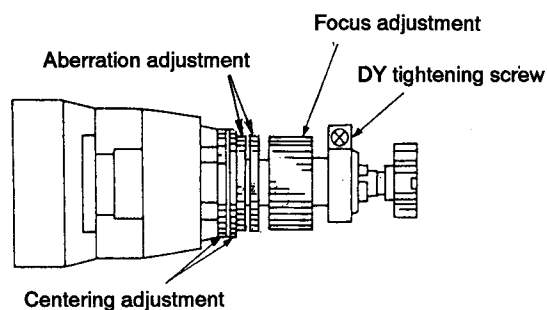


Fig. 7-1-28.

1-4-2. Centering Adjustment

Model	Playback
Signal	Alignment tape: For checking operations (WR5-5NSP) Monoscope section
Specified Value	$\pm 4\%$

Adjusting method:

- 1) Use the centering adjustment ring and adjust so that the left, right, top, and bottom sides of the display are uniform. (Refer to Fig. 7-1-28.)

Note: As the centering position changes due to earth magnetism, rotate it 360 ° in the horizontal direction, and adjust with the center section of the modifying position.

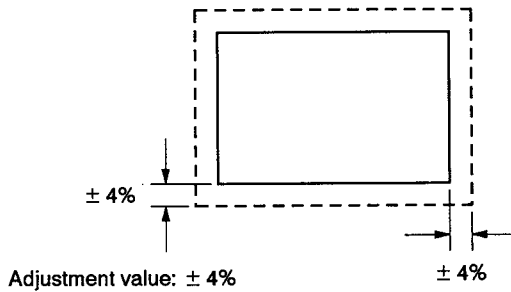


Fig. 7-1-29.

1-4-3. Focus Adjustment

Model	Playback
Signal	Alignment tape: For checking operations (WR5-5NSP) Monoscope section

Adjusting method:

- 1) Adjust the focus ring to obtain the optimum focus. (Refer to Fig. 7-1-28.)

1-4-4. Aberration Adjustment

Model	E-E
Signal	Dot pattern
Specified Value	$T < 2 \cdot D$, $F < D$

Adjusting method:

- 1) Adjust the aberration adjustment ring so that the tracing of the dot becomes less than twice the diameter of the dot, or the fan aberration becomes less than the diameter of the dot.
- 2) If the centering becomes displaced here, perform the centering adjustment from the beginning again.



Fig. 7-1-30.

1-4-5. AFC Adjustment (VF-51 board)

Model	E-E
Signal	Color bar
Measuring Point	C517 ⊕ (CL504)
Measuring Instrument	Digital voltmeter or oscilloscope (DC range)
Adjusting Element	RV504 (AFC)
Specified Value	2.7 ± 0.15 Vdc

Adjusting method:

- 1) Adjust RV504 for 2.7 ± 0.15 Vdc.

1-4-6. Horizontal Amplitude Adjustment (VF-51 board)

Model	Playback
Signal	Alignment tape: For checking operations (WR5-5NSP) Monoscope section
Adjusting Element	C504
Specified Value	$6 \pm 2\%$

Adjusting method:

- 1) Rotate RV505, and adjust the top and bottom sides of the monoscope image to the top and bottom edges of the display.
- 2) Rotate RV904 so that the brightness is the normal level.
- 3) Adjust the pattern (A) of the H size adjustment capacitor (C909) to "short" or "open", so that the horizontal direction over scan becomes $6 \pm 2\%$ (Left and right totals). (Refer to Fig. 7-1-32.)

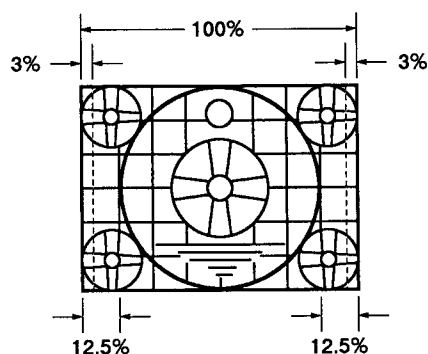
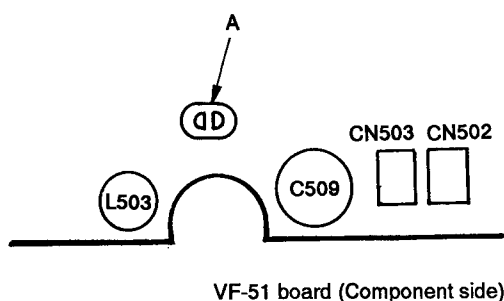


Fig. 7-1-31.



Section A	Size H
Open	Small
Short	Big

Fig. 7-1-32.

1-4-7. Vertical Amplitude Adjustment (VF-51 board)

Model	Playback
Signal	Alignment tape: For checking operations (WR5-5NSP) Monoscope section
Adjusting Element	RV505
Specified Value	$5 \pm 2\%$

Adjusting method:

- 1) Adjust RV505 so that the vertical direction over scan becomes $5 \pm 2\%$ (Top and bottom totals).

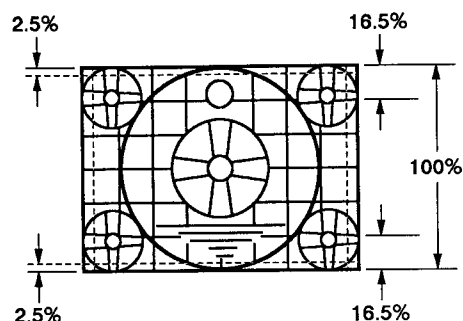


Fig. 7-1-33.

1-4-8. Brightness, Contrast Adjustments (VF-51 board)

Model	Playback
Signal	Alignment tape: For checking operations (WR5-5NSP) Monoscope section
Adjusting Element	Brightness: RV503 Contrast: RV501

Adjusting method:

- 1) Rotate RV503 and RV501 alternately, and adjust so that the bright/dark sections of the gray scale are displayed correctly. (The bright section should be unsatisfactory till the cross hatch appears vague in the monoscope circle. The dark section should be unsatisfactory till the darkest section and the second darkest section of the gray scale cannot be differentiated.)

1-4-9. Horizontal Amplitude, Vertical Amplitude, Focus Check

"1-4-6. Horizontal Amplitude Adjustment" and "1-4-7. Vertical Amplitude Adjustment" should both satisfy the specified values. If not, perform the adjustments from the beginning again. In this case, perform [1-4-8. Brightness, Contrast Adjustments] again. Moreover, check the focus, and if it found to be vague, perform "1-4-3. Focus Adjustment" and "1-4-4. Aberration Adjustment".

1-5. COLOR ELECTRONIC VIEWFINDER SYSTEM ADJUSTMENTS (CCD-FX330)

Note 1: The backlight (fluorescent tube) is driven by a 800 Vp-p, 16 kHz AC power supply.

Therefore, be careful not to touch the backlight holder as you will receive an electric shock.

Note 2: When replacing the LCD unit, ensure there will be no damages by static electricity.

[Adjusting connector]

Most measuring points for adjusting the view-finder are concentrated at CN801 of the VF-68 board. Connect the measuring equipments via the measuring pin tool. The following table lists the pin numbers and signal names of CN801.

Pin No.	Signal Name	Pin No.	Signal Name
1	LC COM	2	EVF GND
3	G OUT	4	13.5V
5	SEFR	6	12V
7	R OUT	8	B OUT
9	BRIGHT	10	PCO

Table 7-1-5.

Measuring pin tool

Parts Code: J-6082-192-A

[Positions of RVs during adjustments]

Unless specified otherwise, set RVs to the following positions and adjust.

- RV953 (BRIGHT) Refer to "BRIGHT Adjustment"
- RV954 (COLOR) Mechanical center
- RV955 (HUE) $20^\circ \pm 15^\circ$ from the mechanical center in the counterclockwise (○).

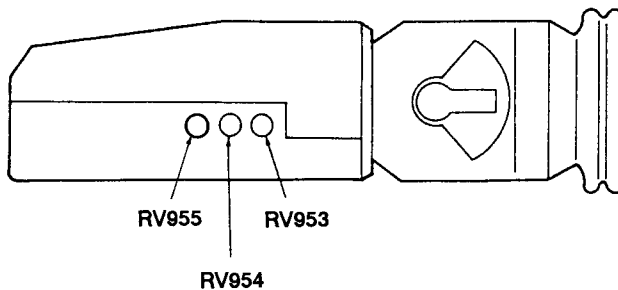


Fig. 7-1-34.

[Power Supply Voltage]

Adjust the power supply voltage for the battery pin so that Pin ① (EVF UNREG) of CN951 of the VF-69 board becomes 6.0 ± 0.1 Vdc.

[Connecting the Pattern Generator]

Connect the pattern generator as shown Fig. 7-1-35.

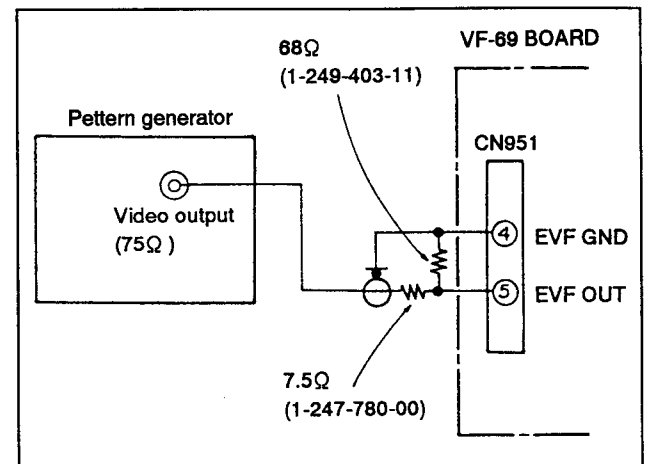


Fig. 7-1-35.

[Video Input Signal for Adjusting]

If the signal column specifies "Color bar signal whose chroma signal and burst signal are turned off", input a color bar signal whose chroma signal and burst signal have been turned off to the video input pin as the video input signal for adjusting. Check that the signal level of Pin ⑤ of CN951 of the VF-69 board is 0.9 ± 0.12 Vp-p before adjusting.

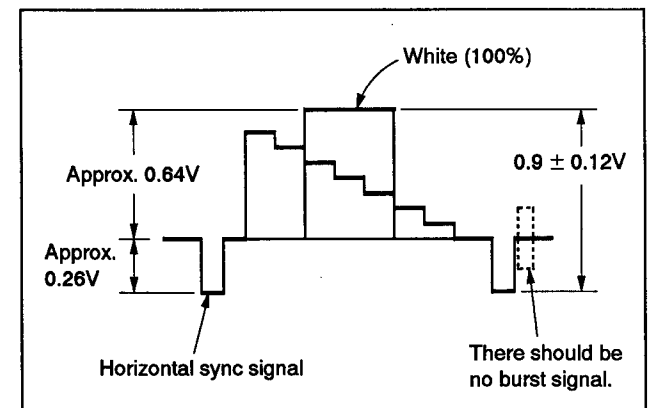


Fig. 7-1-36. Color bar signal turning off chroma and burst signals

1. Current consumption adjustment (VF-69 board)

Adjust the luminance and color temperature of the back light.
If these are not correct, the image will be brighter or darker than normal.

Mode	Stop
Signal	Color bar signal whose chroma signal and burst signal are turned off
Measurement Point	Remove L953 and measure +: Pin ① of CN951 -: ⊕ pin of C958
Measuring Instrument	Ammeter
Adjustment Element	RV951
Specified Value	85 ± 5 mA

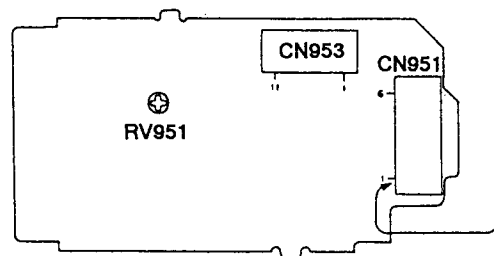
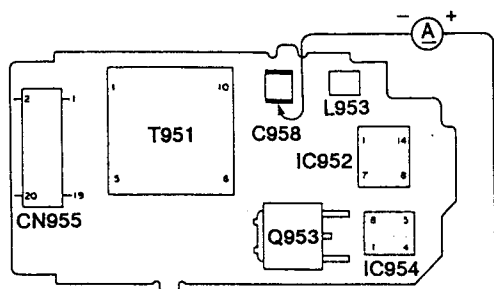
Note 1: Adjust within 30 secs. after the power supply has been turned on.

Note 2: After adjusting, connect L953.

Adjusting method:

1. Check that the voltage of Pin ① of CN951 is 6.0 ± 0.1 Vdc.
2. Adjust the current consumption to 85 ± 5 mA with RV951.

VF-69 board Component side



VF-69 board Conductor side

Fig. 7-1-37.

2. Power supply voltage check (VF-68 Board)

Mode	Stop
Measuring Instrument	Digital voltmeter
+12V check	
Measurement Point	Pin ⑥ of CN801 (12V)
Specified Value	$+11.6 \pm 0.2$ Vdc
+13.5V check	
Measurement Point	Pin ④ of CN801 (13.5V)
Specified Value	$+13.5 \pm 0.3$ Vdc

Checking Method:

1. Check that the UNREG power supply voltage (Pin ① of VF-69 board CN951) of CN951 is 6.0 ± 0.1 Vdc.
2. Check that each power supply voltage satisfies the specified value.

3. VCO adjustment (VF-68 Board)

Set the free running frequency of the VCO.

If it is not correct, the image will waver.

Mode	Stop
Signal	Color bar
Measurement Point	Pin ⑩ of CN801 (PCO)
Measuring Instrument	Oscilloscope (DC range)
Adjustment Element	RV804
Specified Value	$A=2.8 \pm 0.1V$

Adjusting method:

1. Check the GND level of the oscilloscope.
2. Adjust the PCO voltage (A) to the specified value with RV804.

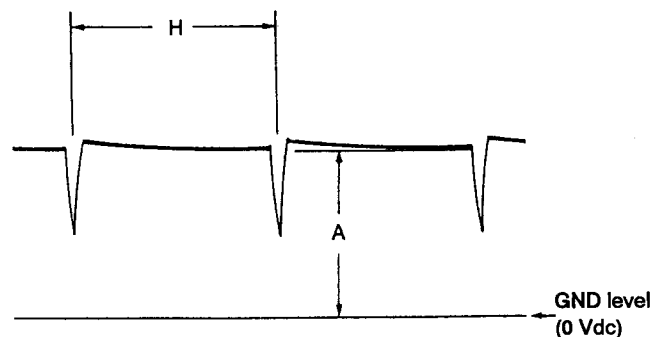
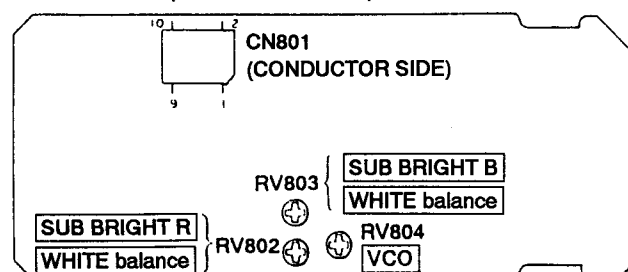


Fig. 7-1-38.

VF-68 BOARD (COMPONENT SIDE)

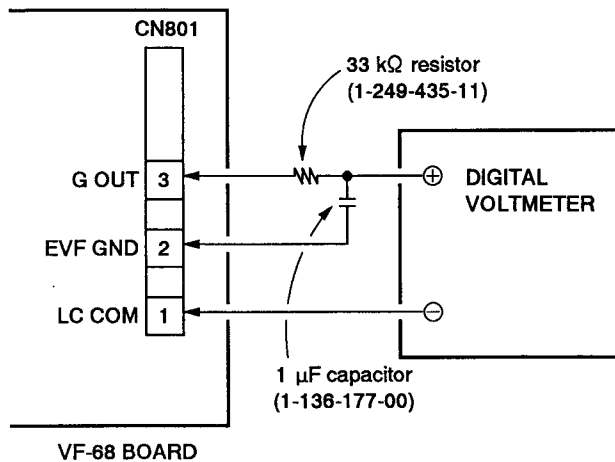


4. LC COM voltage check (VF-68 Board)

Mode	Stop
Signal	Color bar signal whose chroma signal and burst signal are turned off
Measurement Point	+ : Pin ③ of CN801 (G OUT) - : Pin ① of CN801 (LC COM)
Measuring Instrument	Digital voltmeter
Specified Value	$A = +0.35 \pm 0.1 \text{ Vdc}$

Connection:

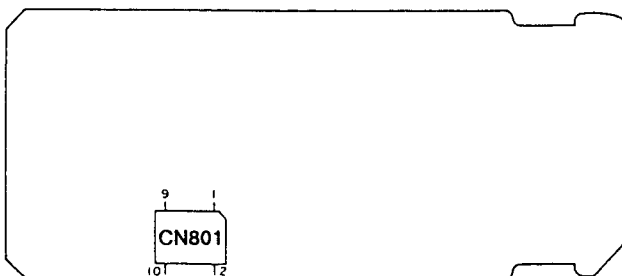
- 1) Connect the digital voltmeter as shown in the following figure.



Checking method:

1. Check that the voltage difference (A) satisfies the specified value.

VF-68 BOARD (CONDUCTOR SIDE)



5. BRIGHT adjustment (VF-69 Board)

Adjust to the proper LCD panel driving video signal level.

If it is not correct, the image will be saturated (whitish) or blackish.

Mode	Stop
Signal	No signal
Measurement Point	Pin ③ of CN801 of VF-68 board (G OUT)
Measuring Instrument	Oscilloscope
Adjustment Element	RV953
Specified Value	$A = 7.2 \pm 0.1 \text{ V}$

Adjusting method:

1. Adjust the potential difference (A) between the reversed waveform pedestal and the non reversed waveform pedestal to the specified value with RV953.

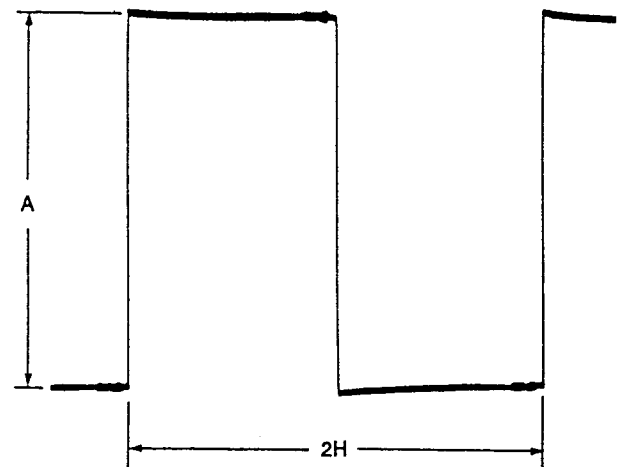
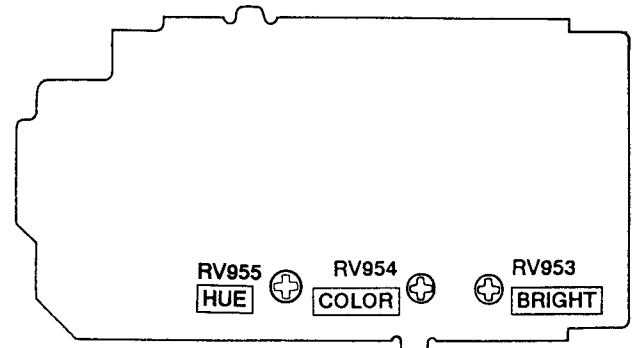


Fig. 7-1-39.

VF-69 BOARD (CONDUCTOR SIDE)



6. CONTRAST check (VF-68 Board)

Mode	Stop
Signal	Color bar signal whose chroma signal and burst signal are turned off
Measurement Point	Pin ③ of CN801 (G OUT)
Measuring Instrument	Oscilloscope
Specified Value	$A=2.3 \pm 0.15V$

Checking method:

1. Check that the white 100% level (A) is the specified value.

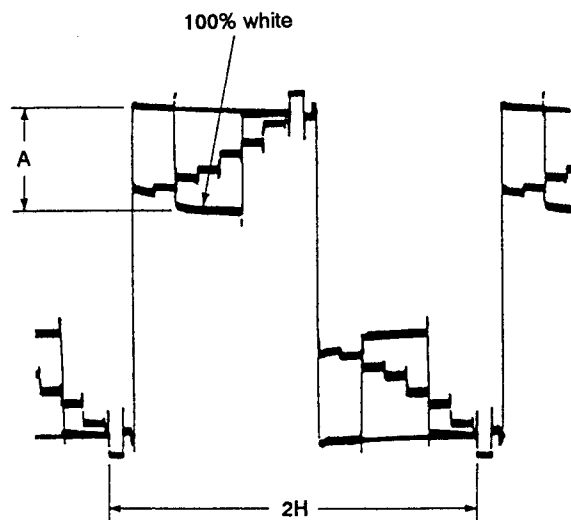


Fig. 7-1-40.

7. SUB BRIGHT R preset adjustment (VF-68 Board)

White balance rough adjustment (1).

Mode	Record
Signal	No signal
Measurement Point	Pin ⑦ of CN801 (R OUT)
Measuring Instrument	Oscilloscope
Adjustment Element	RV802
Specified Value	$A=7.2 \pm 0.1V$

Adjusting method:

1. Adjust the potential difference (A) between the reversed waveform pedestal and the non reversed waveform pedestal to the specified value with RV802.

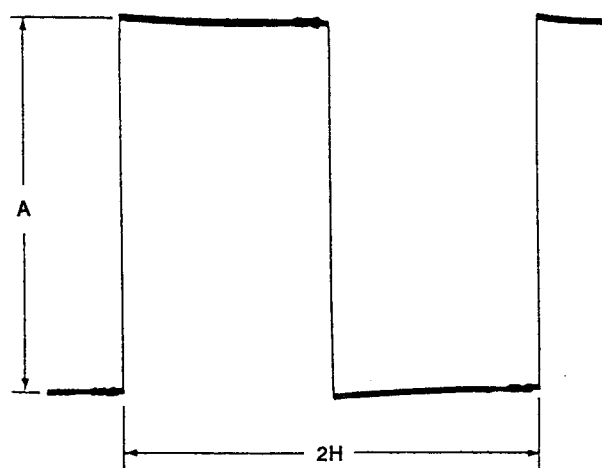
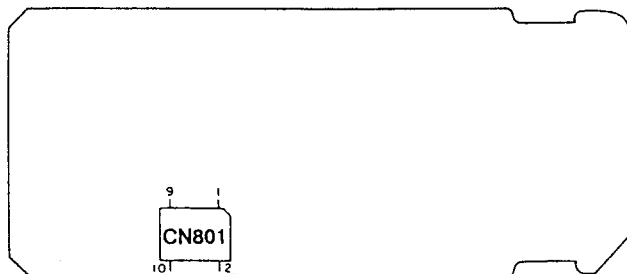
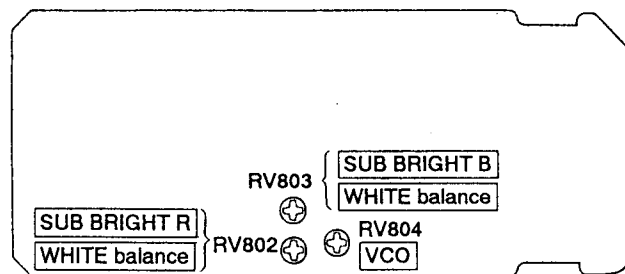


Fig. 7-1-41.

VF-68 BOARD (CONDUCTOR SIDE)



VF-68 BOARD (COMPONENT SIDE)



8. SUB BRIGHT B preset adjustment (VF-68 Board)

White balance rough adjustment (2).

Mode	Record
Signal	No signal
Measurement Point	Pin ⑧ of CN801 (B OUT)
Measuring Instrument	Oscilloscope
Adjustment Element	RV803
Specified Value	$A=7.2 \pm 0.1V$

Adjusting method:

1. Adjust the potential difference (A) between the reversed waveform pedestal and the non reversed waveform pedestal to the specified value with RV803.

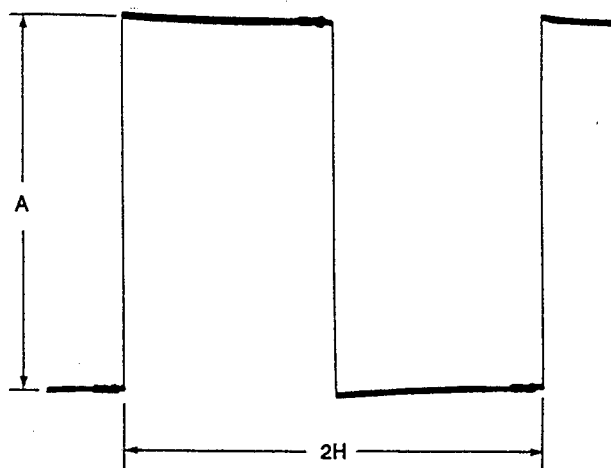


Fig. 7-1-42.

9. White balance adjustment (VF-68 Board)

Adjust to the proper white balance level.

If it is not correct, the color reproducibility of the LCD panel will be poor.

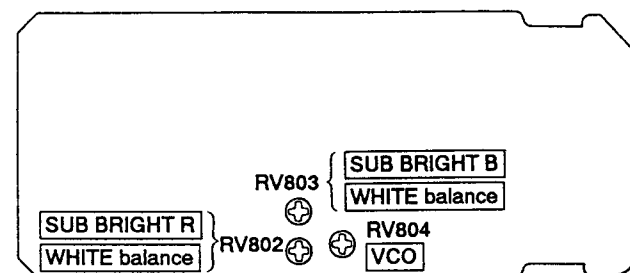
Mode	Record
Signal	Color bar signal whose chroma signal and burst signal are turned off
Measurement Point	Check on LCD display
Measuring Instrument	
Adjustment Element	R: RV802 B: RV803
Specified Value	Picture should not be colored

Note: Turn on the power supply and adjust after more than one minute.

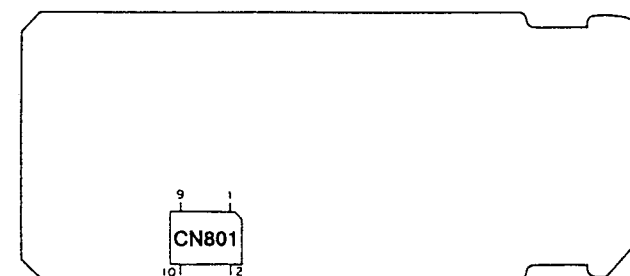
Adjusting method:

1. Check that the LCD display is not colored.
If it is, adjust RV802 and RV803.

VF-68 BOARD (COMPONENT SIDE)



VF-68 BOARD (CONDUCTOR SIDE)



7-2. MECHANICAL SECTION ADJUSTMENTS

For Mechanical Adjustments

Refer to the separate volume of mechanical adjustment "8 mm Video MECHANICAL ADJUSTMENT MANUAL IV (A Mechanism)" for the adjustments and checks of mechanism section and the mechanical parts replacement. (9-973-199-11)

For setting of the track shift mode, however, refer to the following.

2-1. SETTING THE TRACK SHIFT MODE

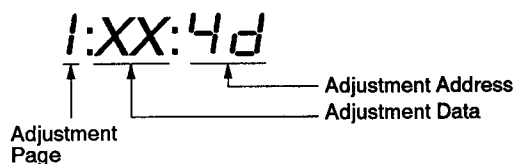
Note: Camera part and video part should have been installed.

[Setting Method]

- 1) Set the adjustment commander to the HOLD ON side.
- 2) Set page: 1, address: 01 and data: 01, and then release the protector.
- 3) Set page: D and address: 01.
- 4) Set adjustment data to 03 (test mode 3) by PLAY or STOP button.

(When HOLD OFF once after the setting and HOLD ON again, the display of the address data will be changed. To set the another mode with shifting, repeat the procedures from 3).

- 5) Set to the HOLD OFF side in order to set the normal mode.



2-2. PREPARATION FOR ADJUSTMENT

- 1) Clean the tape running surfaces (tape guides, drum, capstan shaft, pinch roller.)
- 2) Connect to the oscilloscope.
CH1: CS-48 board CN001 pin ③ (PB RF)
CH2: CS-48 board CN001 pin ④ (SWP)
- 3) Play back the tracking alignment tape (WR5-1NP: 8-967-995-02).
- 4) Check that the RF waveform of the oscilloscope is flat at both inlet and outlet sides. If not flat, make adjustment as follows. (Refer to Fig. 7-2-1 and 7-2-2)

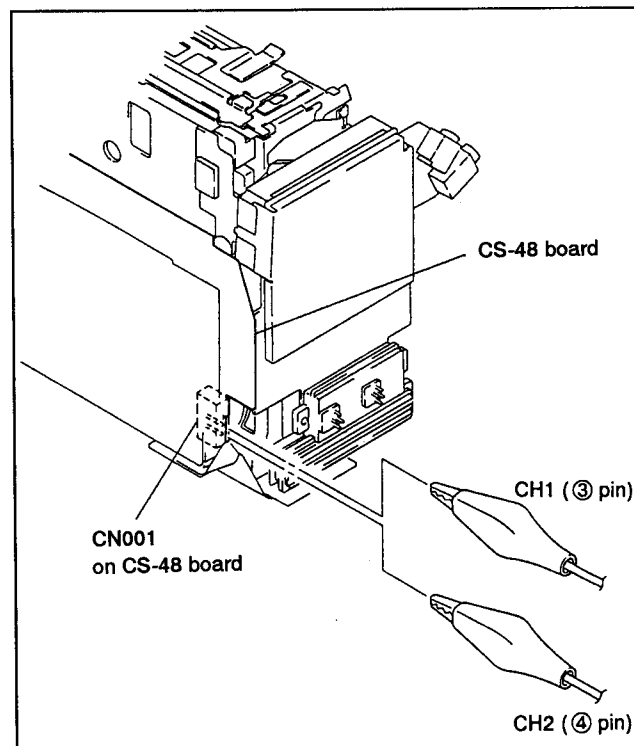


Fig. 7-2-1.

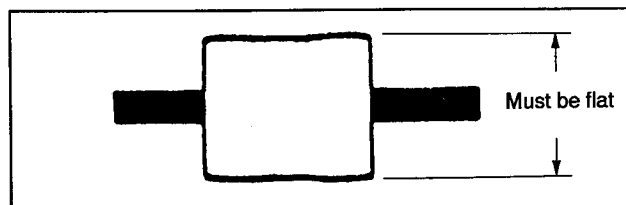


Fig. 7-2-2.

7-3. VIDEO SECTION ADJUSTMENT

When performing adjustments, refer to the layout diagrams for adjustment related parts beginning from page 7-66, 67.

3-1. PREPARATIONS BEFORE ADJUSTMENT

The following adjusting instruments are used for adjusting the video section.

3-1-1. Equipments to be used

- 1) TV monitor
- 2) Oscilloscope: 2 phenomena, band 30 MHz or wider, with delay mode. (Use a 10:1 probe unless specified otherwise.)
- 3) Frequency counter
- 4) Pattern generator with video output terminal
- 5) Digital voltmeter
- 6) Audio generator
- 7) Audio level meter
- 8) Audio distortion meter
- 9) Audio attenuator
- 10) Regulated power supply
- 11) Alignment tape

For tracking adjustment (WR5-1NP)

Part Code: 8-967-995-02

For video frequency characteristics adjustment (WR5-6N)

Part Code: 8-967-995-12

For checking operations

(WR5-4NL)^{Note 1}

Part Code: 8-967-995-51

(WR5-5NSP)^{Note 2}

Part Code: 8-967-995-42

Note: The following alignment tapes can also be used.

- 1) WR5-3NL (8-967-995-31)
- 2) WR5-4NSP (8-967-995-41)
- 12) Remote control unit for adjustment (J-6082-053-A)
- 13) VA-88 board extension cord (20P, 0.8 mm)
Part Code: J-6082-169-A
- 14) VA-88 board extension cord (40P, 0.8 mm)
Part Code: J-6082-168-A
- 15) Mecha deck extension cord (30P, 0.8 mm)
Part Code: J-6082-167-A

3-1-2. Connecting the equipments

Unless specified otherwise, connect the measuring instruments as shown in Fig. 7-3-1 and perform the adjustments.

- Camera/player power switch Position of the player
- Connect the adjusting remote control unit to the remote terminal (PS-334 board J951).

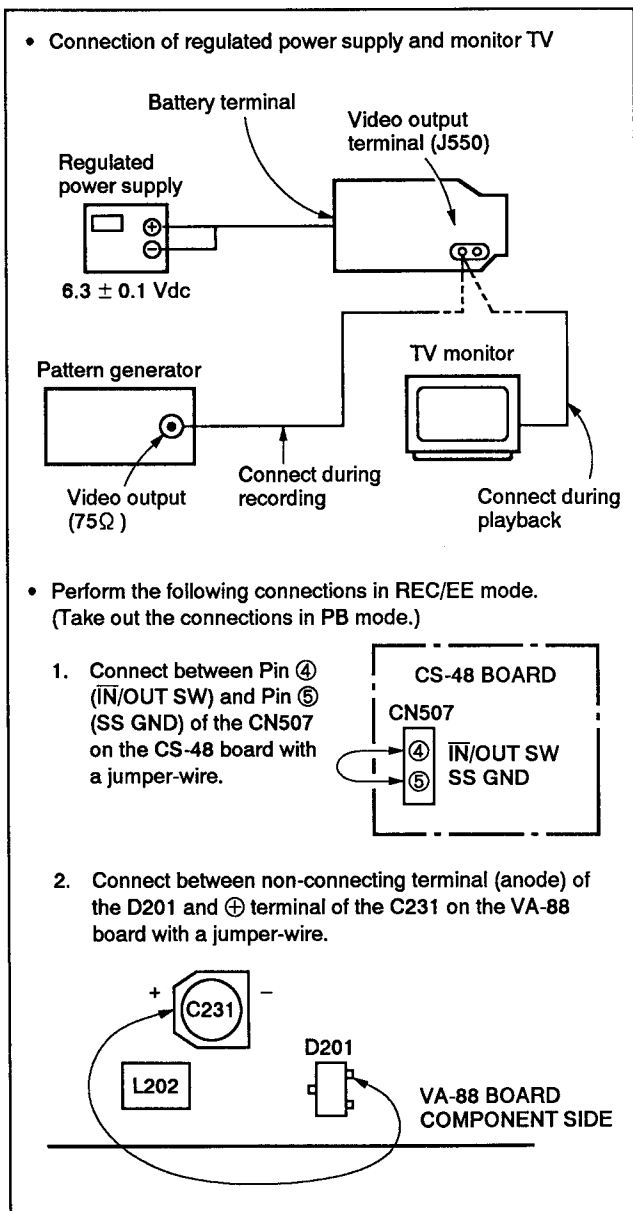


Fig. 7-3-1.

3-1-3. How to Set REC Mode

1. Release the protect of page D with the adjusting remote control unit.
Page: 1, Address: 00, Data: 01
2. Select address 02 of page D.
3. Set data 49, and press the PAUSE button of the adjusting remote control unit.
4. Set the HOLD switch of the adjusting remote control unit to the NORMAL position.
5. Press the REC buttons to set up REC mode.

[Processing after completing adjustments]

1. Release the protect of page D.
Page: 1, Address: 00, Data: 01
2. Set data 48 to page D, address 02, and press the PAUSE button of the adjusting remote control unit.

3-1-4. Precautions Upon Adjustment

- The MA-226 board (Mic amplifier) is not required for adjusting the video section.
- Remove the two lens block installing screws and the following connectors if the lens block gets in the way.
 1. CN801 of the CS-48 board (18 pins)
 2. CN851 of the CS-48 board (20 pins)
 3. CN902 of the CD-128 board (5 pins)
- Use an extension cable when opening the VA-88 board.
 1. Between CN201 of VA-88 board and CN503 of CS-48 board.
40 pins, 0.8 mm pitch extension cable (J-6082-168-A)
 2. Between CN202 of VA-88 board and CN504 of CS-48 board.
20 pins, 0.8 mm pitch extension cable (J-6082-169-A)
- Use an extension cable when opening the CS-48 board, and when checking the operation of the mechanical section.
 1. Between CN502 of CS-48 board and FP-600 board.
30 pins, 0.8 mm pitch extension cable (J-6082-167-A)
- If cabinet (R) gets in the way, remove the following connectors after setting to the forced POWER ON mode using the adjusting remote control unit.
 1. CN505 of the CS-48 board (16 pins)

[How to set the forced POWER ON mode]

1. Release the protect of page D with the adjusting remote control unit.
Page: 1, Address: 00, Data: 01
2. Select address 21 of page D.
3. When the power is turned on in the VTR mode, set data 02. (Set data 01 when the power is turned on in the CAMERA mode.)
4. Press the PAUSE button of the adjusting remote control unit.
5. Disconnect the main power supply (6.3V).

The forced POWER ON mode has been set by the above operations. Hereafter, when the main power is supplied, the power will turn on in the VTR mode (or CAMERA mode). As the position of the power supply switch (CAMERA/OFF/PLAYER) and the presence/absence of the power supply switch becomes unrelated, the cabinet (R) can be removed. (If a lithium battery is installed, perform EJECT operation once.)

Be sure to release the forced POWER ON mode after completing repair/adjustment.

[How to release the forced POWER ON mode]

1. Release the protect of page D.
Page: 1, Address: 00, Data: 01
2. Select address 21 of page D, and set data: 00. (Forced POWER ON mode releasing)
3. Press the PAUSE button of the adjusting remote control unit.

3-1-5. Set-up during Adjustment

As the video signal obtained from the pattern generator is used as an adjustment signal during electric adjustments, ensure that this video input signal is within the specification. Connect the oscilloscope to pin ⑥ of CN400 on the VA-88 board, and check that the amplitude of the sync signal of the video signal is approximately 0.3V, the amplitude of the video section is approximately 0.7V, the amplitude of the burst signal is approximately 0.3V and flat, and that the level ratio of the burst signal and the [red] signal is 0.30: 0.66. The video signal (color bar) used for electric adjustments is shown in Fig. 7-3-2.

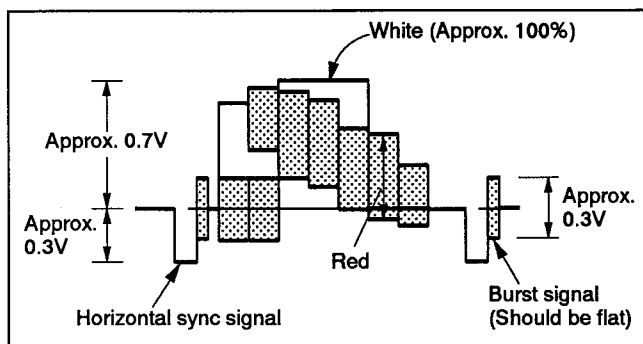


Fig. 7-3-2. Color Bar Signal of the Pattern Generator

3-1-6. Alignment Tape

The following table lists alignment tapes which are available.

Use the tape specified in the signal column for each adjustment.

If the type of tape to be used for checking operations is not specified, use whichever type.

Name	Record-ing mode	Tape type	Tape speed	Recording contents		Usage
				Video area	PCM area	
Tracking WR5-1NP	L	MP	SP	CH2: Signal for 1 MHz tape path adjustment		Tape path adjustment Switching position adjustment
Video frequency characteristics WR5-6N	L	MP	SP	RF sweep 0 to 10 MHz Marker 1, 3.58, 5.5, 7 MHz		Frequency characteristics adjustment
Operation check (SP mode) WR5-5NSP	L	MP	SP	- Video signal Color bar 4 minutes Monoscope 4 minutes - Audio signal (AFM) 400 Hz 60% modulation	Audio signal (PCM) Monoscope section 20 Hz 20 sec. 400 Hz 20 sec. 14 kHz 20 sec. Repeated 4 times 1 kHz 4 minutes	Checking operations
Operation check (LP mode) WR5-4NL	L	MP	LP	- Video signal Color bar 4 minutes Monoscope 4 minutes - Audio signal (AFM) 400 Hz 60% modulation		

Note: Recording mode

L Conventional mode
E hi8 (hi band) mode

Tape type

MP
ME

Particle type metal tape
Evaporated type metal tape

Table 7-3-1.

Fig. 7-3-3. shows the 75% color bar signals recorded on the alignment tape.

Note: Measure using the video output terminal (Terminated at 75 Ω)

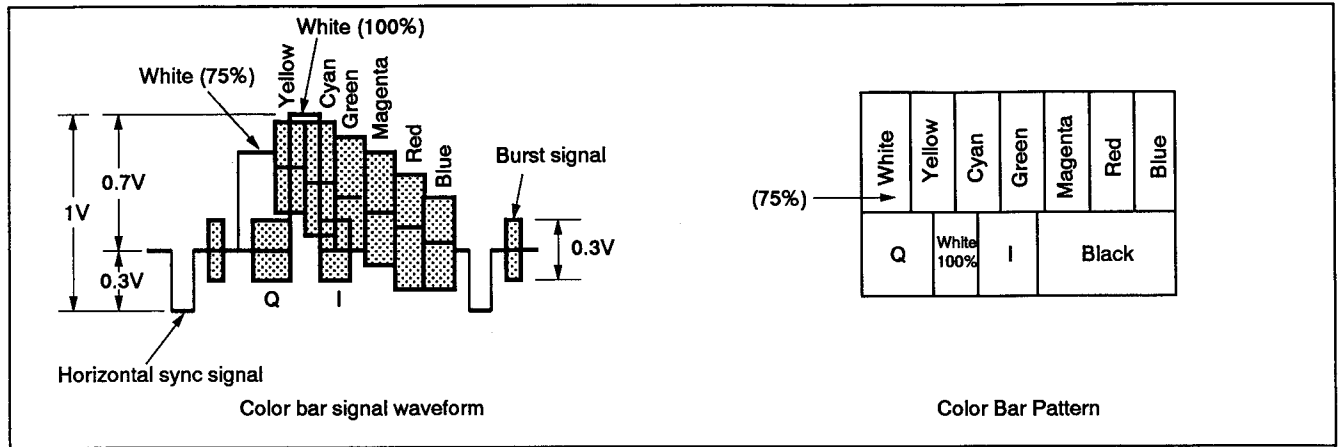


Fig. 7-3-3. Color Bar Signals of the Alignment Tape

3-1-7. Output Level and Impedance

Video output Pin jack
Output signal: 1 Vp-p, 75 unbalanced, sync negative

Audio output Pin jack
Specified output: -7.5 dBs
Output impedance: Below 2.2 k Ω

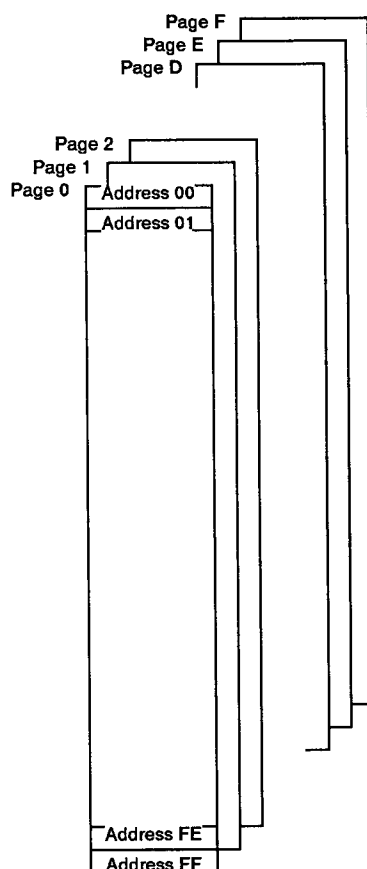
3-1-8. Service Mode

1. Setting the Service mode

The service mode consists of the adjustment mode which adjusts the EVR and the test mode which displays the condition of the unit.

The unit can be shifted into the test mode and adjustment mode by connecting the adjusting remote control unit (set the HOLD switch to the HOLD side).

(1) Service LANC memory map

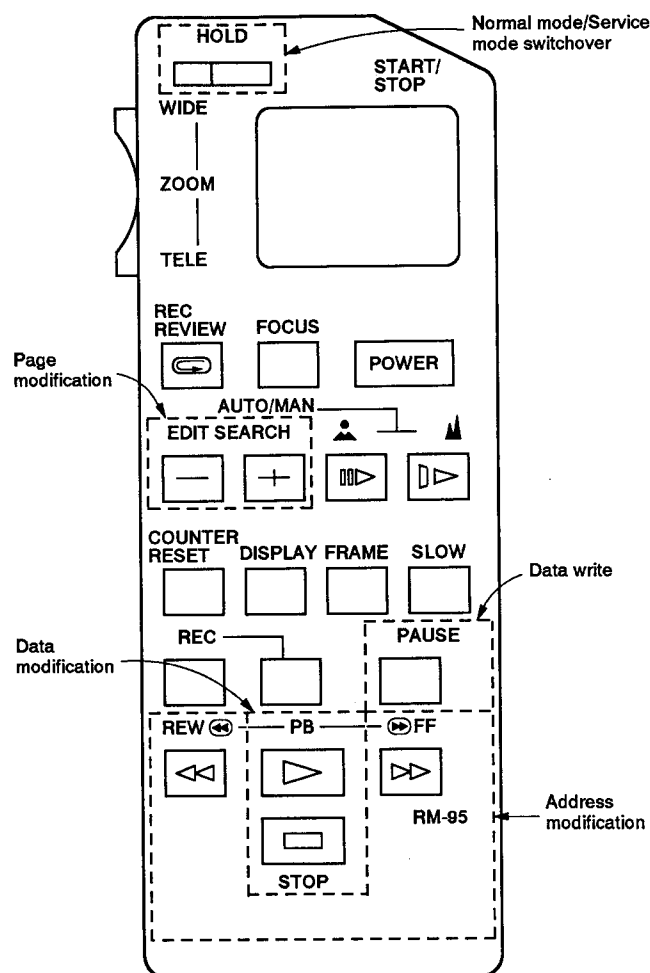


Adjusting Remote Control Unit LCD Display

0:00:00

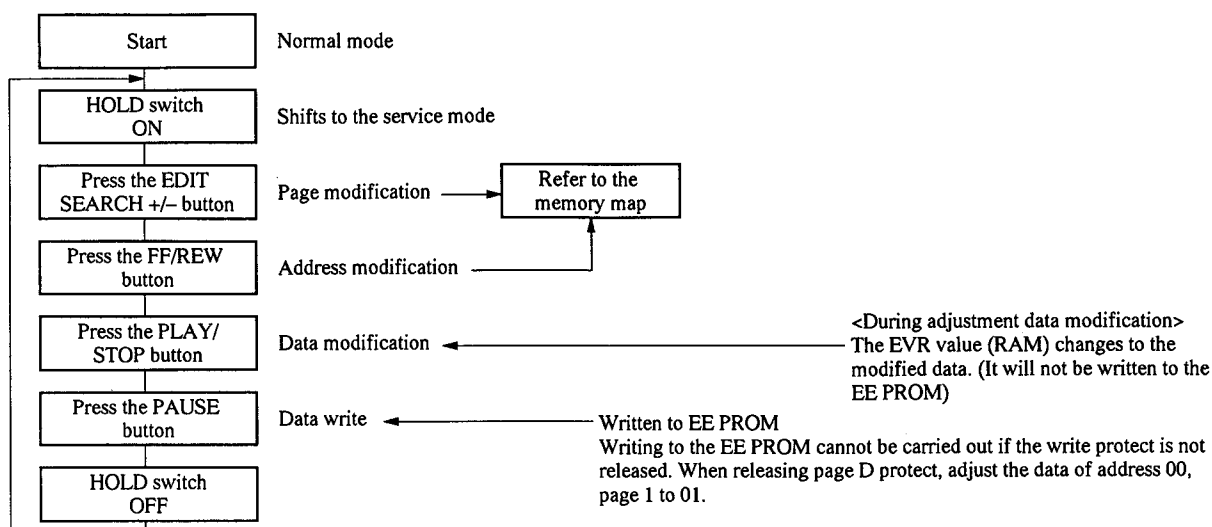
Page Data Address

Adjusting remote control unit RM-95 (J-6082-053-A)



Page	Page allocation	Description
0	Not used	
1	Mode Control RAM, I/O	RAM and I/O interface data memory area required for operating the mode controller. Data is not held when the power is turned off because this area is not ROM.
2~4	Mechanical Control RAM, I/O	RAM and I/O memory area of the mechanical controller.
5	Not used	
6~8	Camera Control RAM, I/O	RAM and I/O memory area of the camera control.
9	Not used	
A	Camera Control RAM, I/O	RAM and I/O memory area of the camera control.
B, C	Not used	
D	VTR EE-PROM	ROM memory area of the VTR part. Data of this area is held by EE-PROM when the power is turned off. Releasing protect is required for changing data.
E	Not used	
F	Camera EE-PROM	ROM memory area of the camera part. Data of this area is held by EE-PROM when the power is turned off.

(2) Shifting to the Service Mode Using the Adjusting Remote Control Unit



Command Name	Command Function	Normal LANC command
Page Up	Page +1	Edit Search +
Page Down	Page -1	Edit Search -
Direc Page Set	Sets the specified page	Event Clear
Address Up	Address +1	Fast Forward
Address Down	Address -1	Rewind
Data Up	Data +1	Play Back
Data Down	Data -1	Stop
Store	Write the data to the EE PROM. RAM	Pause

2. Types of Self-diagnostic Feature

MODE		Contents
TEST	Camera adjustment	Refer to Camera Adjustment
	Switching position adjustment	
	Battery DOWN adjustment	Refer to each adjustment page
	Video, Audio adjustment	
ADJUST	Pass Adjustment track shift	When adjusting tape pass, set this mode and shift the tracking.
	Emergency STOP inhibition	Detection of emergency is inhibited. This allows the following items. • Power is not turned off when the battery is ended. • SP/LP is not automatically distinguished. • Emergence is not detected except for TOP/END detection of the TAPE.
	Read of emergence code	The following functions are added to the emergency display function currently in use. ① The lithium battery is not required because to memorize into EE-PROM is allowed. ② The first emergency and the last emergency are memorized. ③ The mode when the emergency is generated is memorized, in addition to the emergency contents.
	Motor single check	Rotating in forward direction, reverse direction, stopping of each motor can be separately controlled. • Drum motor • Capstan motor • Loading motor
	Function switch check	The acceptance of the function switch of the unit can be confirmed by designating an address. On the contrary, RM-95 can command the substitution for the function switch of the unit.
	Mechanical switch check	The contents of the mechanical switch and the mode switch can be confirmed.
	Sensor check	The following sensor is input by performing A/D converting, and the A/D converted value can be confirmed. TOP sensor, End sensor, S REEL FG, T REEL FG, Thermistor for SWP correction, DEW sensor.
	Reception contents check of wireless remote control	The received code contents of the remote control code can be confirmed.

3. Page D Write Protect

Release/set the page D write protect.

Page 1	Address 00
--------	------------

Data	Function
00	Normal (Write protect condition)
01	Write protect release

4. Page F Write Protect

Release/set the page F write protect.

Page 6	Address 00
--------	------------

Data	Function
10	Normal (Write protect condition)
01	Write protect release

5. Test Mode Setting

Each type of test mode is set/released. Release the protect (page: 1, address: 00, data: 01), before setting the data.

Page D	Address 01
Data	Function
00	Normal
01	Test mode 1 Various emergency inhibition and release Drum, capstan, loading motor, reel, tape top, end, DEW SP/LP automatic distinction inhibition, manual switchover 5 minutes pause release inhibition Power off inhibition • release by battery end
02	Test mode 2 1'CH frequency response adjustment SP/LP automatic distinction inhibition, manual switchover
03	Test mode 3 Track shift Plays back the track shift Rear lock distinction inhibition during PB SP/LP automatic distinction inhibition, manual switchover
04	Test mode 4 Rear lock mode Rear lock playback is performed SP/LP automatic distinction inhibition, manual switchover
05	Test mode 5 SP/LP automatic distinction inhibition, manual switchover

※ This address data will be recorded on the non-volatile memory by pressing the PAUSE button on the adjusting remote control unit. Take note, as when this happens, the test mode will not be released even if the main power is turned off (6.3 Vdc).

※ Be sure to return the data of this address data to 00 after completing adjustments/repairs.

6. Emergency code

Troubles (errors) can be checked.

Page D	Address 06
--------	------------

First emergency code

.....The first error code generated

Page D	Address 07
--------	------------

Last emergency code

..... The last error code generated (this data will be modified each time an error occurs.)

※ Be sure to rewrite the data of addresses 06 and 07 to 00 after completing repairs/adjustments.

※ When rewriting data, be sure to press the PAUSE button of the remote control unit after resetting the data.

Code	Error condition
00	No error
01	Loading motor error
02	Reel error during unloading
03	Other reel errors
04	Capstan error
05	DRUM FG error during drum start up
06	DRUM PG error during drum start up
07	DRUM FG error during drum regular condition
08	DRUM PG error during drum regular condition
09	DRUM Phase error during drum regular

7. Emergency mode

The operation mode during an error outbreak can be checked.

Page D	Address 08
--------	------------

First emergency mode

.....The operation mode when the first error is generated

Page D	Address 09
--------	------------

Last emergency mode

.....The operation mode when the last error is generated
(This data will be modified each time an error occurs.)

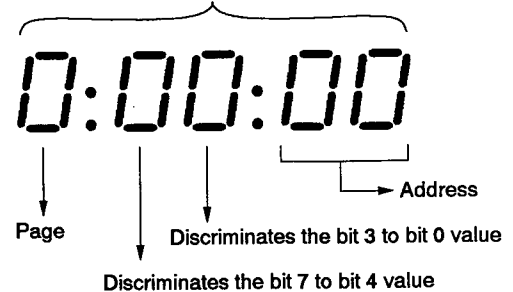
- ※ Be sure to rewrite the data of addresses 08 and 09 to 00 after completing repairs/adjustments.
- ※ When rewriting data, be sure to press the PAUSE button of the remote control unit after setting the data.
- ※ Addresses 08 and 09 of page 0 and addresses 08 and 09 of page D have the same functions.

Code	Error condition
00	BEFOR INITIALIZE
01	EJECTED
02	NORMAL STOP
03	FF
04	NORMAL REC
06	NORMAL PB
07	PB PAUSE
12	LOADING
14	REC PAUSE
26	X1
27	1/5 SLOW
31	UNLOADING
36	-X1
37	-1/5 SLOW
46	CUE
47	1/10 SLOW
56	REVIEW
57	-1/10 SLOW
62	STOP TAPE END
66	X2
67	FRAME
72	STOP TAPE TOP
76	-X2
77	-FRAME
83	REWIND
85	REC REVIEW(+)
95	REC REVIEW(-)
A2	EMERGENCY STOP
A5	EDIT SEARCH(+)
B1	EMERGENCY UNLOADING
B2	STOP EMERGENCY 1
B5	EDIT SEARCH(-)
C2	STOP EMERGENCY 2
E2	STOP NO CASSETTE
F5	EDIT PAUSE

8. Bit value Discrimination

It is necessary to discriminate the bit value by the adjusting remote control unit display data for the following items. Discriminate if the bit value is "1" or "0" using the following table.

Adjusting remote control unit display



Remote Control Unit Display	Bit Value			
	bit 3 or bit 7	bit 2 or bit 6	bit 1 or bit 5	bit 0 or bit 4
0	0	0	0	0
1	0	0	0	1
2	0	0	1	0
3	0	0	1	1
4	0	1	0	0
5	0	1	0	1
6	0	1	1	0
7	0	1	1	1
Ⓐ→ 8	1	0	0	0
9	1	0	0	1
A (R)	1	0	1	0
B (b)	1	0	1	1
C (c)	1	1	0	0
D (d)	1	1	0	1
Ⓑ→ E (E)	1	1	1	0
F (F)	1	1	1	1

(Example) When the remote control unit display data is "8E", the bit values of bit 7 to bit 4 can be discriminated from column Ⓐ, and that of bit 3 to bit 0 can be discriminated from column Ⓑ.

9. Check of Power Switch, Tape Distinction Switch, etc.

Page 1				Address 3E			
Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
				REC PROOF	ME/MP		

["1"=ME tape
 ["0"=MP tape
 ["1"=Recording impossible
 ["0"=Recording possible

Page 1				Address 23			
Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
					CC DOWN		

— "0"=During cassette compartment lock

10. RECOG SW Check

Page 1				Address 3D			
Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
V MUTE	A MUTE	VA PB MODE	JOG	PB CLOG	REC CLOG	SYNC DET	LP/SP

["1"=LP mode playback
 ["0"=SP mode playback

["1"=SYNC is detected
 ["0"=SYNC is not detected

["1"=CLOG is detected
 ["0"=Normal

["1"=When the PB RF signals are being playback normaly
 ["0"=Others

["1"=JOG mode
 ["0"=Other

["1"=Playback mode
 ["0"=Others

["1"=AUDIO MUTE: ON
 ["0"=AUDIO MUTE: OFF

["1"=VIDEO MUTE: ON
 ["0"=VIDEO MUTE: OFF

11. Individual Operations of the Drum, Capstan, and Loading Motor

Page 4	Address 11
--------	------------

- 1) Adjust the mechanical section to the loading completion condition.
- 2) Release the protect.
Page: 1, address: 00, data: 01
- 3) Set data: 01 to page: 4, address: 0E.
(Control permission from the adjusting remote control unit of the motor)
- 4) By setting the data in the following table to page: 4, address: 11, the corresponding motors can be operated individually.
- 5) After checking the operations, turn off the main power (6.3 Vdc).

Data	Operation
00	Normal
02	Drum forward rotation
04	Drum reverse rotation
06	Capstan forward rotation
08	Capstan reverse rotation
0A	Loading motor forward rotation
0C	Loading motor reverse rotation
03	All motors stop
05	
07	
09	
0B	
0D	
0F	

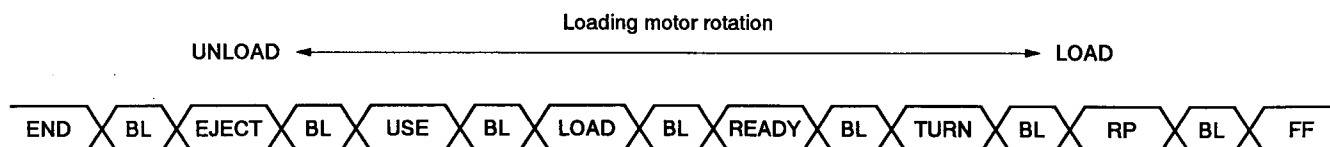
12. Mode Switch Check

The mode switch position (mechanical section condition) can be checked.

Page 1	Address 3E
--------	------------

Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
MSW 0	MSW 1	MSW 2					

			POSITION	FUNCTION	CC DOWN
0	0	0	BL	Interval of each position	
0	1	1	END	FULL END processing (T side lock removal)	1
0	0	1	EJECT	Cassette compartment ejection	1
1	0	1	USE	EJECTED (Unskate end)	1
0	0	1	LOAD	LOADING (Skate in)	0
1	0	0	READY	NORMAL STOP position	0
1	1	0	TURN	OFF of pinch roller only with PB ↔ REV (oscillating position)	0
0	1	0	RP	PB, REC, RVS, REV, REW	0
0	0	0	FF	FF/CUE	0



13. Mode control micro processor key matrix check

The key input can be checked.

Page 1	Address 68-6C
--------	---------------

	Bit7	Bit6 (K IN 6)	Bit5 (K IN 5)	Bit4 (K IN 4)	Bit3 (K IN 3)	Bit2 (K IN 2)	Bit1 (K IN 1)	Bit0 (K IN 0)
Address 68 (K OUT 0)			VTR POWER				START/STOP	STANDBY
Address 69 (K OUT 1)			CAMERA POWER		COUNTER RESET	FF	REW	EJECT
Address 6A (K OUT 2)			REMOTE ON/OFF		TAPE/BATT CHECK	STOP	PLAY	EDIT ON/OFF
Address 6B (K OUT 3)				TIME	DATE	PAUSE		
Address 6C (K OUT 4)				BACK LIGHT				

**14. Wireless Remote Control Unit Reception
Content Check**

Page 1	Address 1E
--------	------------

Wireless remote control unit key pressed	Data
None	FF
TELE	9A
WIDE	9B
Start/stop	99
Rewind	1B
Fast forward	1C
Stop	18
Playback	1A
Data screen	5A
Pause	19
SLOW	23

15. Page D Address List

Note 1: The adjustment data initial value is the data to be input before performing video section adjustment (page D), when the page D data has been erased due to some cause.

Note 2: The data listed in the adjustment data memo column are the fixed data.

Check that these data have not been accidentally rewritten, after completing adjustments.

Address	Name	Function [] Indicate the adjustment voltage output terminal	Adjustment data							
			Initial value	Memo column						
00		Not used	00	00						
01	Test mode		00	00						
02	Destination flag		49	48						
03	BATT END	Battery end adjustment	90							
04	SW POSITION	SW POSITION adjustment	80							
05	SW POSITION	SW POSITION adjustment	0B							
06	EMERGENCY code (FIRST)	Error code and mode are memorized. Rewrite the data of these addresses to 00 after repairs/adjustments	00	00						
07	EMERGENCY code (LAST)		00	00						
08	EMERGENCY mode (FIRST)		00	00						
09	EMERGENCY mode (LAST)		00	00						
0A		Design data	24	24						
0B		Design data	3E	3E						
0C		Design data	24	24						
0D		Design data	3E	3E						
0E		Design data	24	24						
0F		Design data	3E	3E						
10		Design data	24	24						
11		Design data	3E	3E						
12		Design data	24	24						
13		Design data	3E	3E						
14		Not used								
15		Not used								
16		Not used								
17		Not used								
18		Not used								
19		Not used								
1A		Not used								
1B		Not used								
1C		Not used								
1D		Not used								
1E		Not used								
1F		Not used								
20		Design data	8C	8C						
21		FORCED VTR ON, CAM ON etc <table><tr><td>DATA</td><td>MODE</td></tr><tr><td>01</td><td>FORCED CAMERA POWER ON</td></tr><tr><td>02</td><td>FORCED VTR POWER ON</td></tr></table>	DATA	MODE	01	FORCED CAMERA POWER ON	02	FORCED VTR POWER ON	00	00
DATA	MODE									
01	FORCED CAMERA POWER ON									
02	FORCED VTR POWER ON									
22~29		Not used								

Table 7-3-2 (1).

Address	Name	Function [] Indicate the adjustment voltage output terminal	Adjustment data	
			Initial value	Memo column
2A		Design data	00	00
2B		Design data	00	00
2C		Design data	00	00
2D	BATT REMAIN 1	Amount of remaining battery 1	A3	
2E	BATT REMAIN 2	Amount of remaining battery 2	9E	
2F	BATT REMAIN 3	Amount of remaining battery 3	98	
30~39		Not used		
3A		Design data	C0	C0
3B~42		Not used		
43	MT 1CH	1CH playback frequency characteristics adjustment [IC204 ②]	C6	
44		Not used		
45	MT 2CH	2CH playback frequency characteristics adjustment [IC204 ③]	C5	
46	REC C RF (EE)	REC C RF adjustment [IC203 ⑩]	B1	
47		Design data	00	00
48		Design data	77	77
49		Design data	70	70
4A	EE LEVEL	EE level adjustment [IC203 ⑪]	74	
4B		Not used		
4C	COMB ADJ	Chroma comb filter adjustment [IC203 ③]	A6	
4D	SR-IR	IR adjustment [IC203 ②]	A9	
4E		Not used		
4F	CARR	Y-FM carrier frequency adjustment [IC203 ⑤]	A9	
50		Not used		
51	DEV	Y-FM deviation adjustment [IC203 ⑥]	98	
52		Not used		
53		Not used		
54	REC Y (ME)	REC Y recording current adjustment (ME) [IC203 ⑦]	75	
55	REC Y (MP)	REC Y recording current adjustment (MP) [IC203 ⑦]	75	
56		Design data	00	00
57		Design data	00	00
58		Design data	00	00
59	PB Y (L)	Normal PB Y level adjustment [IC204 ⑮]	A6	
5A	EMPH LVL (EE)	EE emphasis input level adjustment [IC203 ④]	98	
5B	EMPH LVL (PB)	Playback emphasis input level adjustment [IC203 ④]	B0	
5C~77		Not used		
78		Design data	A7	A7
79		Design data	A5	A5
7A	1.5 IR	1.5 MHz IR adjustment [IC204 ⑥]	90	
7B	1.5 DEV	1.5 MHz deviation adjustment [IC204 ⑦]	7B	
7C		Design data	90	90
7D		Design data	55	55
7E		Design data	00	00
7F~FF		Not used		

Table 7-3-2 (2).

3-2. POWER SYSTEM ADJUSTMENTS

1. Oscillator Frequency Check (PS-334 board)

Mode	Camera record
Subject	Arbitrary
Measurement Point	Q952 collector
Measuring Instrument	Frequency counter
Specified Value	464 $\pm$ 5 kHz

Adjusting method:

- 1) Check that the oscillator frequency satisfies the specified value.

2. Power Voltage Check (PS-334 board)

Mode	Camera record
Subject	Arbitrary
Measuring Instrument	Digital voltmeter
EVF 5V check	
Measurement Point	Pin ⑥ of CN950
Specified Value	5.01 $\pm$ 0.15 Vdc
D5V check	
Measurement Point	Pins ⑰ and ⑱ of CN950
Specified Value	4.98 $\pm$ 0.15 Vdc
D4V check	
Measurement Point	Pins ⑮ and ⑯ of CN950
Specified Value	4.03 $\pm$ 0.15 Vdc
VIDEO 5V check	
Measurement Point	Pins ② and ④ of CN950
Specified Value	5.01 $\pm$ 0.15 Vdc
SS 5V check	
Measurement Point	Pin ⑳ of CN950
Specified Value	5.02 $\pm$ 0.15 Vdc
AUDIO 5V check	
Measurement Point	Pin ⑧ of CN950
Specified Value	5.05 $\pm$ 0.15 Vdc
CAM5V check	
Measurement Point	Pins ⑬ and ⑭ of CN950
Specified Value	4.90 $\pm$ 0.15 Vdc
15V check	
Measurement Point	Pin ⑪ of CN950
Specified Value	15.04 $\pm$ 0.4 Vdc
-9V check	
Measurement Point	Pin ⑫ of CN950
Specified Value	-8.5 $\pm$ 0.4 Vdc

3-3. SYSTEM CONTROL SYSTEM ADJUSTMENTS

1. Page D Initial Value Input

If the page D data has been erased due to some cause, input the page D initial value before performing adjustments. For details on the initial value, refer to "Page D address list" in "3-1-8. Service Mode".

Mode	E-E
Signal	Arbitrary
Adjustment Page	D
Adjustment Address	00 to 7D

Input method:

- 1) Release the write protect.
Page: 1, address: 00, data: 01
- 2) Select page D, and input the initial value to each address.
(After setting the data (initial value), be sure to press the PAUSE button of the adjusting remote control unit before changing the address.)

2. Battery End Adjustment

Set the battery end voltage.

If the voltage is not incorrect, the life of the battery will shorten, or the image at the battery end will be rough.

Mode	Camera record
Signal	Arbitrary
Measurement Point	LCD display of the adjusting remote control unit
Measuring Instrument	
Adjustment Page	D
Specified Value	03 (BATT END) 2D (BATT REMAIN 1) 2E (BATT REMAIN 2) 2F (BATT REMAIN 3)

Connection:

- 1) Connect the regulated power supply and the digital voltmeter as shown in Fig. 7-3-4.

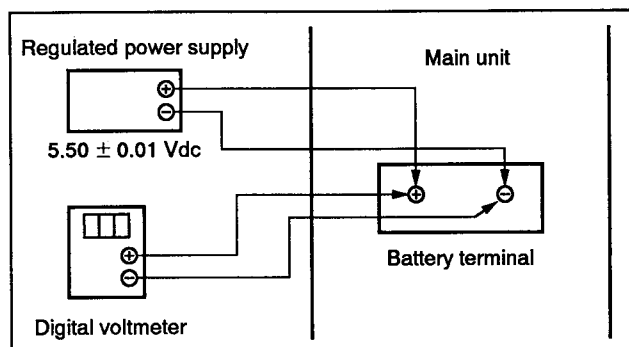


Fig. 7-3-4.

Adjusting method:

- 1) Adjust the output voltage of the regulated power supply so that the digital voltmeter display is 6.3 ± 0.1 Vdc.
- 2) Release the protect.
Page: 1, address: 00, data: 01
- 3) Set data: 01 to page: 4, address: 01.
(Test mode 1 setting)
- 4) Decrease the output voltage of the regulated power supply so that the digital voltmeter display is 5.50 ± 0.01 Vdc.
- 5) Select page: 4, address: 10, read the adjusting remote control unit display data, and set to D10.
- 6) Set data D10 to page: D, address: 03, and press the PAUSE button of the adjusting remote control unit.
- 7) Convert D10 to decimal to obtain D10'. (Refer to Table 7-1-4. "Hexadecimal notation - decimal notation conversion table")
- 8) Obtain the adjustment data (decimal) by following formula (decimal notation calculation), convert to hexadecimal and enter the data into each adjustment address.
Address: 2D $D2D' = D10' + 18$
Address: 2E $D2E' = D10' + 14$
Address: 2F $D2F' = D10' + 8$
Note: After setting the data, be sure to press the PAUSE button of the adjusting remote control unit before changing the address.
- 9) Set data: 00 to page: 4, address: 01.
(Test mode 1 release)
- 10) Perform "Battery Down Check".

3. Battery Down Check

Mode	Camera record
Subject	Arbitrary

Connection

- 1) Connect the regulated power supply and the digital voltmeter as shown in Fig. 7-3-4.

Checking method:

Remove the adjusting remote control unit, and perform the following check. If the check is not satisfied, perform from the beginning again.

- 1) Adjust the output voltage of the regulated power supply so that the digital voltmeter display becomes 6.3 ± 0.1 Vdc.
- 2) Set to the camera recording mode.
- 3) Decrease the output voltage of the regulated power supply so that the digital voltmeter display becomes 5.70 ± 0.01 Vdc.
- 4) Check that the $\square$ mark on the EVF (viewfinder) display is not lighted up. (TALLY lamp lights up).
- 5) Decrease the the output voltage of the regulated power supply so that the digital voltmeter display becomes 5.58 ± 0.01 Vdc.
- 6) Check that the $\square$ mark and the TALLY lamp on the EVF display on the EVF display blinks every second.
- 7) Decrease the the output voltage of the regulated power supply so that the digital voltmeter display becomes 5.42 ± 0.01 Vdc.
- 8) Check that the $\square$ mark and the TALLY lamp on the EVF display are blinking faster, the VTR stops and the power supply turns off.

3-4. SERVO SYSTEM ADJUSTMENTS

1. Switching Position Adjustment (CS-48 board)

Switching timing of video head setting.

If deviated in this case causes switching noise or jitter on the played back screen.

Mode	Playback
Signal	Alignment tape: For tracking adjustment (WR5-1NP)
Measurement Point	CH1: Pin ④ of CN001 (RF SWP) CH2: Pin ③ of CN001 (PB RF)
Measuring Instrument	Oscilloscope
Adjustment Page	D
Adjustment Address	04 (SW POSITION) (LOW) 05 (SW POSITION) (HIGH)
Specified Value	$t_1 = 0 \pm 10 \mu\text{sec}$

Adjusting method:

- 1) Release the protect.
Page: 1, address: 00, data: 01
- 2) Set data: 0B to page: D, address: 05.
- 3) Change the data of page: D, address: 05 and minimize "t₁".
(Coarse adjustment)
- 4) Change the data of page: D, address: 04, and adjust so that the switching position (t₁) becomes the specified value.
(Fine adjustment)
- 5) Press the PAUSE button of the adjusting remote control unit.

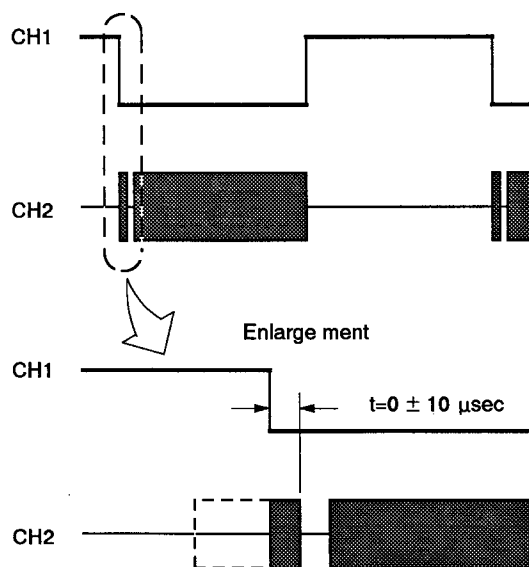


Fig. 7-3-5.

3-5. VIDEO ADJUSTMENTS

The adjustments of the video system must be performed according to the following adjustment procedure.

The color video signal supplied from the pattern generator is used as the video input signal for adjusting the video system in recording mode. Check that the sync signal and the color burst signal satisfy the specification specified during the adjustment set-up shown in Fig. 7-3-2.

[Adjusting procedure]

- 1) Playback frequency characteristic adjustment
- 2) Flying erase check
- 3) VXO oscillation frequency check
- 4) EE level adjustment
- 5) IR adjustment
- 6) Chroma comb filter adjustment
- 7) Emphasis input level adjustment
- 8) PB Y level adjustment
- 9) PB LINE OUT level adjustment
- 10) Y FM carrier frequency adjustment
- 11) Y FM deviation adjustment
- 12) Chroma emphasis f₀ adjustment
- 13) REC Y level adjustment
- 14) REC C RF level adjustment
- 15) REC ATF level check

1. Playback Frequency Characteristic Adjustment (CS-48 board)

Eliminate the differences in the head characteristics of each channel.

If there are differences, flickers and over modulation noises will be produced.

Note 1: The adjusting element for CH2 is shown in parentheses [].

Mode	Playback
Signal	Alignment tape: For frequency characteristic adjustment (WR5-6N)
Measurement Point	CH1: Pin ③ of CN001 EXT TRIG: Pin ④ of CN001
Measuring Instrument	Oscilloscope TRIG SLOPE: +, [-]
Adjustment Page	D
Adjustment Address	43 (MT 1CH) [45 (MT 2CH)]
Specified Value	3.58 MHz level: 5.5 MHz level= 4: (3 ± 0.3)

Adjusting method:

- 1) Release the protect.
Page: 1, address: 00, data: 01
- 2) Change the data of address: 43 [45] of page D, and adjust the level ratio of 3.58 MHz and 5.5 MHz of PB RF output waveform to the specified value.

Note 2: After each address adjustment, be sure to press the PAUSE button of the adjusting remote control unit and memorize the data.

Note 3: If the waveform is not stable, set data: 03 to page: 4, address: 01. (Test mode 3 setting)
After completing adjustment, set data: 00 to page: 4, address: 01.

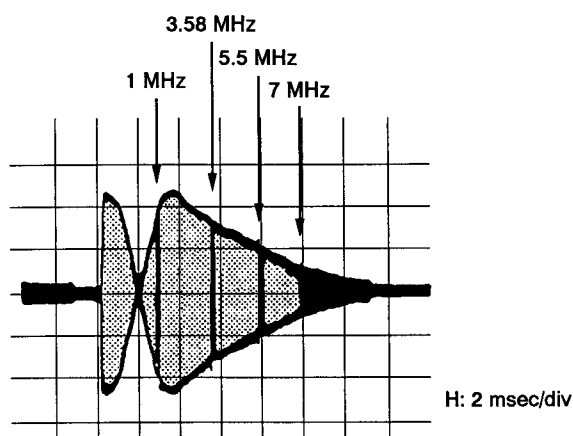


Fig. 7-3-6.

2. Flying Erase Check (CS-48 board)

Mode	Record
Signal	Arbitrary
Measurement Point	Pin ② of CN002 (FE (X))
Measuring Instrument	Oscilloscope and frequency counter
Specified Value	Frequency: Above 7.0 MHz Voltage: Above 7.0 Vp-p

Note: Use a MP type tape.

Checking method:

- 1) Check that the oscillation frequency is above 7.0 MHz and that the oscillation voltage is above 7.0 Vp-p.

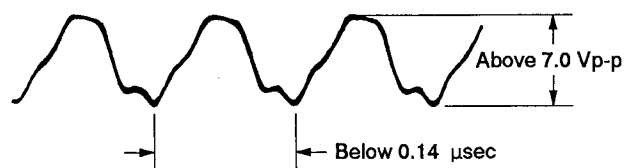


Fig. 7-3-7.

3. VXO Oscillation Frequency Check (VA-88 board)

Mode	E-E
Signal	Color bar
Measurement Point	Pin ⑫ of IC301 (CL228)
Measuring Instrument	Frequency counter
Specified Value	3579545 ± 70 Hz

Note: Connect the frequency counter via a high impedance (approximately 10 MΩ) and low capacity (below 10 pF) buffer.

Adjusting method:

- 1) Check that the oscillation frequency of pin ⑫ of IC301 is 3579545 ± 70 Hz.

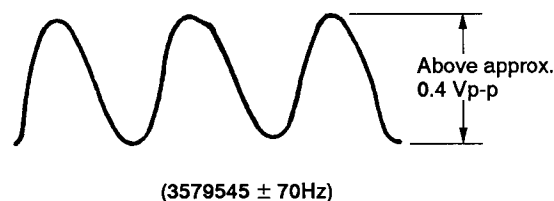


Fig. 7-3-8.

4. EE Level Adjustment (VA-88 board)

Adjust so that the Y signal level to be recorded becomes consistent.

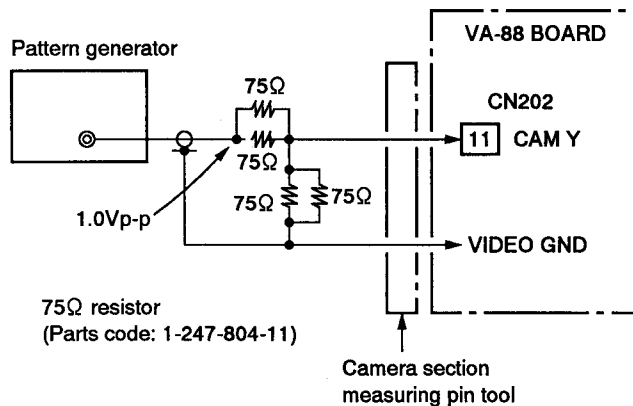
If it is not consistent, the camera EE image and OA image will be brighter or darker than normal.

Mode	Camera mode recording
Signal	Y signal of color bar (Note 2)
Measurement Point	Pin ⑥ of CN400 (VIDEO OUT) ^{Note}
Measuring Instrument	Oscilloscope
Adjustment Page	D
Adjustment Address	4A (EE LEVEL)
Specified Value	A=1.00 ± 0.025V

Note 1: Remove the jumper wire connecting Pin ④ and Pin ⑤ of CN507 on the CS-48 board and that connecting the empty pin D201 and C231 ⊕ of the VA-88 board.

Note 2: Input the Y signal using the camera section measuring pin tool (J-6082-139-A) as shown in the following figure.

Connect Pin ⑬ (CAM C) of CN202 and C231 ⊕ (VIDEO 4.9V) on the VA-88 board using a jumper wire.



Note 3: Terminate pin ⑥ of CN400 at 75Ω .
After completing adjustments, remove the 75Ω resistor.

Adjusting method:

- 1) Release the protect.
Page: 1, address: 00, data: 01
- 2) Change the data of page: D, address: 4A, and adjust so that the Y signal level (A) becomes the specified value.
- 3) Press the PAUSE button of the adjusting remote control unit.

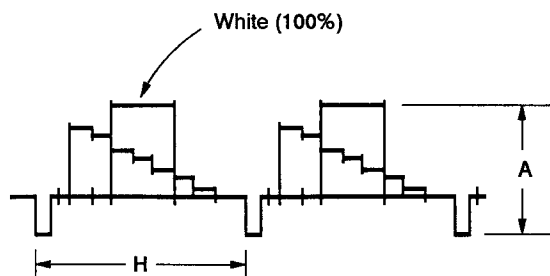


Fig. 7-3-9.

5. IR Adjustment (VA-88 board)

Y level of emphasis circuit setting.

If deviated, this causes too bright or too dark image during play back after recording.

Mode	E-E
Signal	Color bar
Measurement Point	Pin ⑦ of IC201 (Y COMB OUT) (CL243)
Measuring Instrument	Oscilloscope
Adjustment Page	D
Adjustment Address	4D (SR IR)
Specified Value	Residual chroma component (A) is minimum (below 80 mVp-p)

Connection

- 1) Connect pin ⑭ of IC201 (or pin ② of IC205) to pin ⑤ of IC201 (CL225) with a jumper wire.

Adjusting method:

- 1) Release the protect.
Page: 1, address: 00, data: 01
- 2) Change the data of page: D, address: 4D, and adjust so that the residual chroma component (A) becomes minimum.
- 3) Press the PAUSE button of the adjusting remote control unit.

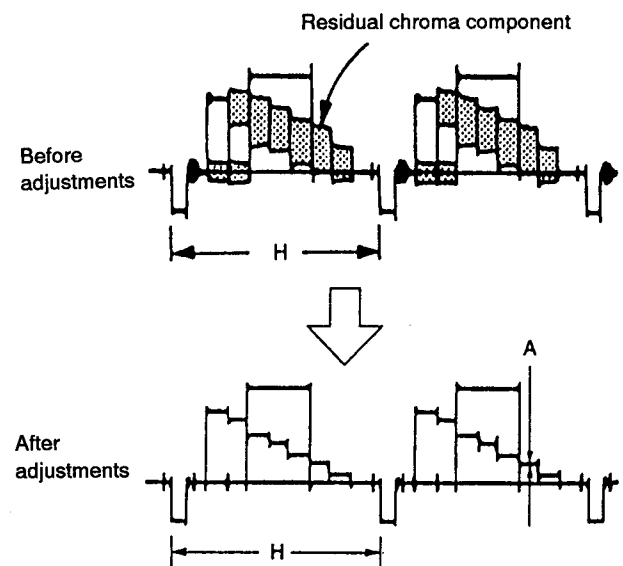


Fig. 7-3-10.

6. Chroma Comb Filter Adjustment (VA-88 board)

Set the level and phase of the 1H delayed signal for the comb filter.

If deviated, this causes marked occurrence of beets in played back picture.

Mode	E-E
Signal	Color bar
Measurement Point	Pin ⑩ of IC201 (C+CD) (CL242)
Adjusting Element	Oscilloscope
Measuring Instrument	RV051 (Phase)
Adjustment Page	D
Adjustment Address	4C (C COMB)
Specified Value	Residual chroma component (A) is minimum.

Adjusting method:

- 1) Release the protect.
Page: 1, address: 00, data: 01
- 2) Change the data of page: D, address: 4C, and adjust the residual chroma component to minimum.
- 3) Adjust RV051 so that the residual chroma component (A) becomes minimum.
- 4) Repeat steps 2) through 3).
- 5) Press the PAUSE button of the adjusting remote control unit.

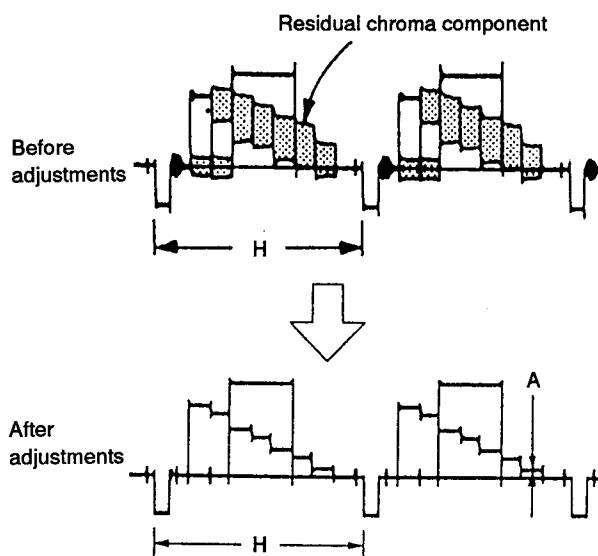


Fig. 7-3-11.

7. Emphasis Input Level Adjustment (VA-88 board)

Emphasis circuit input Y signal level setting.

If deviated, this causes excessive brightness or darkness.

Mode	E-E
Signal	Color bar
Measurement Point	Pin ⑤ of IC206 (or Pin ③ of IC201) (CL244)
Measuring Instrument	Oscilloscope
Adjustment Page	D
Adjustment Address	5A (EMPH LVL (EE))
Specified Value	A=0.50 ± 0.025V

Adjusting method:

- 1) Release the protect.
Page: 1, address: 00, data: 01
- 2) Change the data of page: D, address: 5A, and adjust so that the Y signal level (A) becomes the specified value.
- 3) Press the PAUSE button of the adjusting remote control unit.

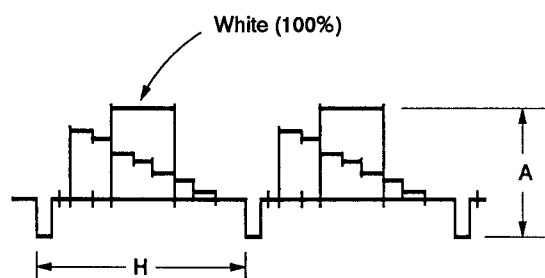


Fig. 7-3-12.

8. PB Y Level Adjustment (VA-88 board)

De-emphasis circuit input Y signal level setting.

If deviated, this causes excessive brightness or darkness.

Mode	Playback
Signal	Alignment tape: For checking operations (WR5-5NSP) Color bar section
Measurement Point	Pin ② of IC201 (CL221)
Measuring Instrument	Oscilloscope
Adjustment Page	D
Adjustment Address	59 (PB Y (L))
Specified Value	$A=0.50 \pm 0.025V$

Adjusting method:

- 1) Release the protect.
Page: 1, address: 00, data: 01
- 2) Playback the color bar section of the normal mode alignment tape (WR5-5NSP).
- 3) Change the data of page: D, address: 59, and adjust so that the Y signal level (A) becomes the specified value.
- 4) Press the PAUSE button of the adjusting remote control unit.

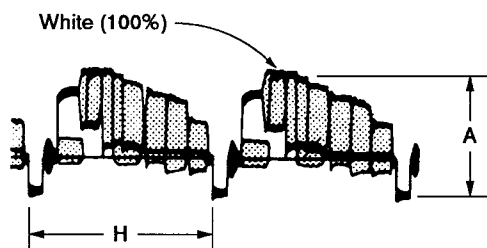


Fig. 7-3-13.

9. PB LINE OUT Level Adjustment

PB LINE OUT level setting.

If deviated, this causes too bright or too dark picture.

Mode	Playback
Signal	Alignment tape: For checking operations (WR5-5NSP) Color bar section
Measurement Point	Video output terminal (terminated at 75 Ω)
Measuring Instrument	Oscilloscope
Adjustment Page	D
Adjustment Address	5B (EMPH LVL (PB))
Specified Value	$A=1.0 \pm 0.05V$

Adjusting method:

- 1) Release the protect.
Page: 1, address: 00, data: 01
- 2) Change the data of page: D, address: 5B, and adjust so that the video signal level (A) becomes the specified value.
- 3) Press the PAUSE button of the adjusting remote control unit.

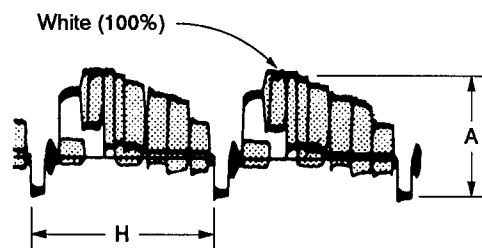


Fig. 7-3-14

10. Y FM Carrier Frequency Adjustment (VA-88 board)

FM carrier frequency of REC Y signal setting.

If deviated, this caused blurred played back picture or deteriorated resolution.

Mode	E-E
Signal	No signal
Measurement Point	Pin ④ of IC201 (Y RF OUT) (CL218)
Measuring Instrument	Frequency counter
Adjustment Page	D
Adjustment Address	4F (Y FM CARRIER)
Specified Value	4.38 ± 0.04 MHz

Adjusting method:

- 1) Release the protect.
Page: 1, address: 00, data: 01
- 2) Change the data of page: D, address: 4F, and adjust so that the Y FM carrier frequency becomes the specified value.
- 3) Press the PAUSE button of the adjusting remote control unit.
- 4) Perform "Deviation Adjustment".

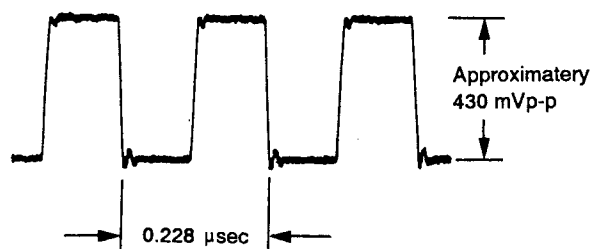


Fig. 7-3-15.

11. Deviation Adjustment (VA-88 board)

FM deviation of REC Y signal setting.

If deviated, this causes too bright/dark image, or marked occurrence of black stretch or deteriorated resolution.

Mode	Record and playback
Signal	Color bar
Measurement Point	Pin ② of IC201 (CL221)
Measuring Instrument	Oscilloscope
Adjustment Page	D
Adjustment Address	51 (Y FM DEVIATION)
Specified Value	$A=0.50 \pm 0.025V$

Note: Check that "Emphasis Input Level Adjustment", "PB Y Level Adjustment" and "Y FM Carrier Frequency Adjustment" have been completed.

Adjusting method:

- 1) Release the protect.
Page: 1, address: 00, data: 01
- 2) Record the color bar signal.
- 3) Playback the recorded signal.
- 4) Check the playback signal level (A).
Specification: $A=0.50 \pm 0.025V$
- 5) If the specification is not satisfied, change the data of page: D, address: 51, and repeat steps 2 to 4.

Playback signal level	Changing the data
When smaller than the specified value	Increase
When bigger than the specified value	Decrease

- 6) Press the PAUSE button of the adjusting remote control unit.

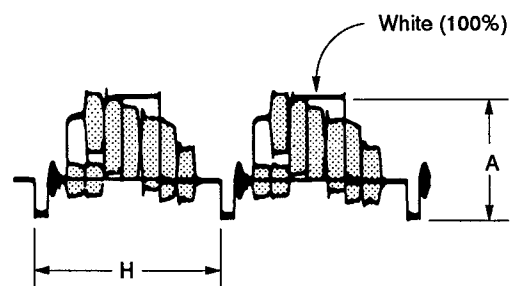


Fig. 7-3-16.

12. Chroma Emphasis fo Adjustment (VA-88 board)

Emphasis center frequency setting.

If deviated, this causes unnatural color.

Mode	Record
Signal	Color bar
Measurement Point	Pin ② of IC203 (CL233)
Measuring Instrument	Oscilloscope
Adjustment Element	FL302
Specified Value	Minimum fo component

Adjusting method

- 1) Adjust FL203 so that the amplitude of the latter section of the chroma signal (yellow section) becomes minimum.

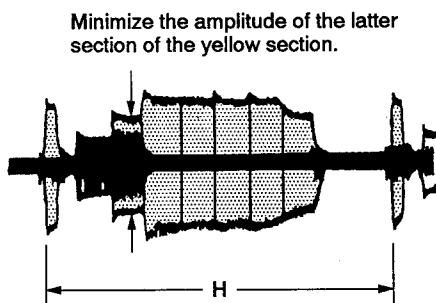


Fig. 7-3-17.

13. REC Y Level Adjustment (VA-88 board)

Set REC Y signal level.

If deviated, this causes black stretch over modulation noise or color shade.

Mode	E-E
Signal	No signal
Measurement Point	Pin ⑤ of IC054 (CL145)
Measuring Instrument	Oscilloscope Band width limit: 20 MHz
Adjustment Page	D
Adjustment Address	55 (REC (MP)), 54 (REC Y (ME))
Specified Value	A=220 ± 5 mVp-p

Note: Use a MP type tape.

Adjusting method:

- 1) Release the protect.
Page: 1, address: 00, data: 01
- 2) Change the data of page: D, address: 55, and adjust so that the Y signal level (A) becomes the specified value.
- 3) Press the PAUSE button of the adjusting remote control unit.
- 4) Set the same data of address: 55 to address: 54.
- 5) Press the PAUSE button of the remote control unit.

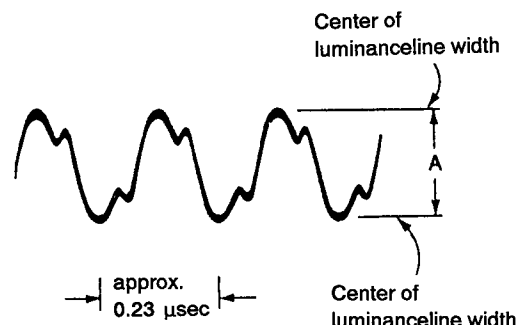


Fig. 7-3-18.

14. REC C RF Level Adjustment (VA-88 board)

Set REC CHROMA signal level.

If it is lower than its normal level, chroma signal noises on played back picture will increase.

If it is set higher, Y signal noises will increase and white modulation noises will be produced.

Mode	E-E
Signal	No signal
Measurement Point	Pin ③ of IC054 (CL144)
Measuring Instrument	Oscilloscope
Adjustment Page	D
Adjustment Address	46
Specified Value	$A=110 \pm 10 \text{ mVp-p}$

Note: Use a MP type tape.

Adjusting method

- 1) Release the protect.
Page: 1, address: 00, data: 01
- 2) Change the data of page: D, address: 46, and adjust so that the chroma signal level (A) becomes the specified value.
- 3) Press the PAUSE button of the adjusting remote control unit.

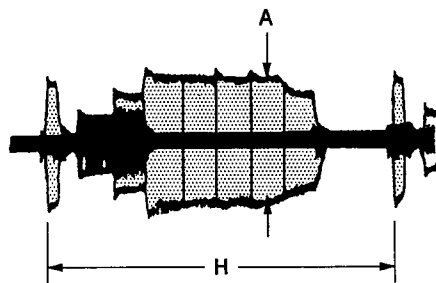


Fig. 7-3-19.

15. REC ATF Level Checking (CS-48 board)

Mode	Record
Signal	No signal
Measurement Point	Pin ⑮ of IC501
Measuring Instrument	Oscilloscope
Specified Value	$A=600 \pm 30 \text{ mVp-p}$

Checking method

- 1) Confirm that the REC ATF signal level (A) satisfies the specified value.

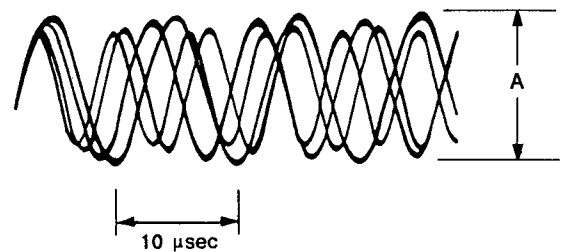


Fig. 7-3-20.

3-6. AUDIO SYSTEM ADJUSTMENT

- Perform the adjustment using the color bar signal as a video signal input.

[Connecting the measuring instruments for the audio]

Connect the audio system measuring instruments besides the video system measuring instruments as shown in Fig. 7-3-21, and perform adjustments with the power switch [player] position.

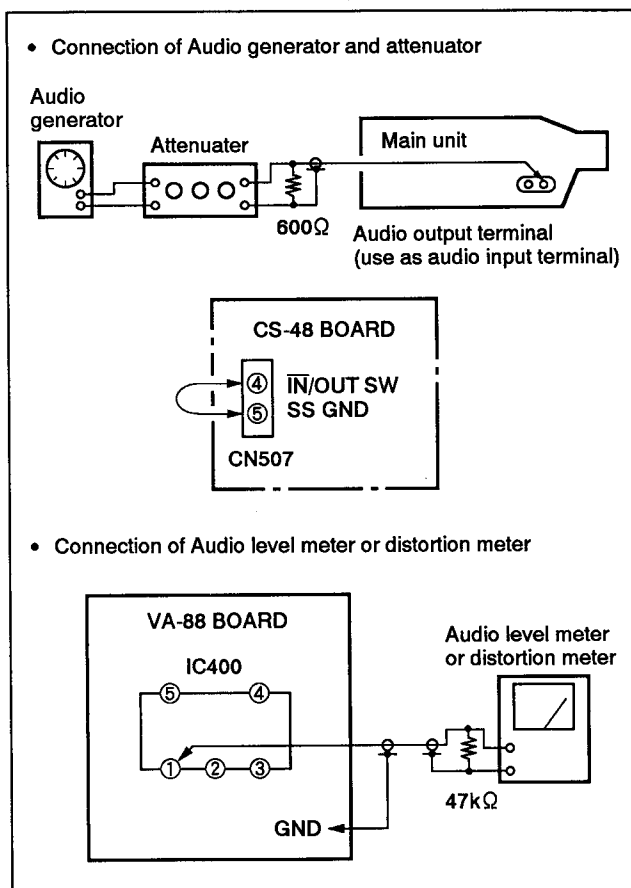


Fig. 7-3-21.

[Adjustment Procedure]

- Carrier frequency check
- Recording level check
- E-E output level check
- IR adjustment
- Deviation adjustment
- Overall level characteristics, distortion check
- Overall noise level check

1. Carrier Frequency Check (VA-88 board)

Mode	Record
Signal	No signal
Measurement Point	Pin ⑤ of CN202 (REC AFM RF)
Measuring Instrument	Frequency counter (Note 1)
Specified Value	1.500 ± 0.002 MHz

Note: Use a high impedance (above 1 MΩ) and low capacity (below 20 pF) probe.

Checking method:

- Check that the 1.5 MHz carrier frequency satisfies the specified value.

2. Record Level Check (VA-88 board)

Mode	Record
Signal	No signal
Measurement Point	Pin ⑤ of CN202 (REC AFM RF)
Measuring Instrument	Oscilloscope
Specified Value	$A=340 \pm 40$ mVp-p

Checking method:

- Check that the 1.5 MHz carrier level satisfies the specified value.
(Read the center of the luminance line width and note down the level read.)

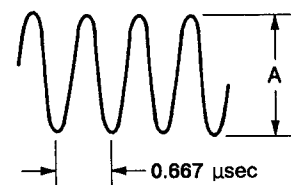


Fig. 7-3-22.

3. E-E Output Level Check (VA-88 board)

Mode	Record
Signal	400 Hz, -7.5 dBs audio input terminal
Measurement Point	Pin ⑩ of IC401 or Pin ① of IC400
Measuring Instrument	Oscilloscope
Specified Value	925^{+240}_{-190} mVp-p (-7.5 ± 2 dBs)

Checking method:

- Check that the 400 Hz signal level satisfies the specified value.

4. IR Adjustment (VA-88 board)

Set the characteristics of filter.

If is not correct, distortion and noises will stand out.

Mode	Playback
Signal	Alignment tape: For checking operations (WR5-5NSP)
Measurement Point	+ : Pin ⑥ of IC401 - : Pin ④ of IC401 (C428 ⊕)
Measuring Instrument	Digital voltmeter
Adjustment Page	D
Adjustment Address	7A (1.5 IR)
Specified Value	The DC voltage difference between pins ④ and ⑥ is 0 ± 10 mVdc

Adjusting method:

- 1) Release the protect.
Page: 1, address: 00, data: 01
- 2) Change the data of page: D, address: 7A and adjust so that the DC voltage becomes 0 ± 10 mVdc.
- 3) Press the PAUSE button of the adjusting remote control unit.

5. Deviation Adjustment

Adjusts the 1.5 MHz AFM signal deviation.

If improper, the playback level will differ from that of other unit.

Mode	Playback
Signal	Alignment tape: For checking the operation (WR5-5NSP)
Measurement Point	Audio output terminal
Measuring Instrument	Oscilloscope
Adjustment Page	D
Adjustment Address	7B (1.5 DEV)
Specified Value	-7.5 ± 1.0 dBs

Adjusting method:

- 1) Release the protect.
Page: 1, address: 00, data: 01
- 2) Change the data of page: D, address: 7B, and adjust so that the 400 Hz signal level becomes the specified value.
- 3) Press the PAUSE button of the adjusting remote control unit.

6. Overall Level Characteristic, Distortion Check

Mode	Self recording/playback
Signal	400 Hz, -7.5 dBs: Audio input terminal
Measurement Point	Audio output terminal
Measuring Instrument	Audio level meter and distortion meter
Specified Value	Level: -7.5 ± 2.5 dBs Distortion rate: Below 0.5% (Note 1)

Note: 1) Value when the following filter is used

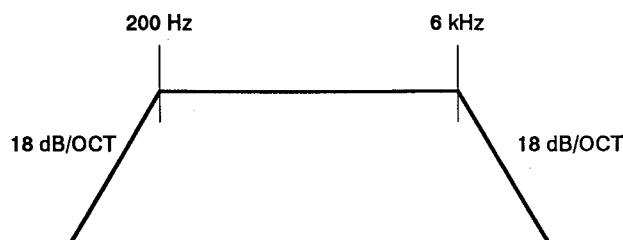


Fig. 7-3-23.

Checking method:

- 1) Input the 400 Hz, -7.5 dBs signal only to the audio input terminal.
- 2) Record the signal.
- 3) Remove the input signal.
- 4) Playback the recorded section.
- 5) Check that the 400 Hz signal level of the audio output terminal is -7.5 ± 2.5 dBs, and that the distortion rate is below 0.5% (Note 1).

7. Overall Noise Level Check

Mode	Self recording
Signal	No signal: Audio input terminal
Measurement Point	Audio output terminal
Measuring Instrument	Audio level meter (Use an IHF-A curve auditory correction filter)
Specified Value	Below -65.0 dBs

Checking method:

- 1) Remove the audio input signal.
- 2) Record.
- 3) Playback the recorded section.
- 4) Check that the noise level of the audio output terminal is below -65.0 dBs.